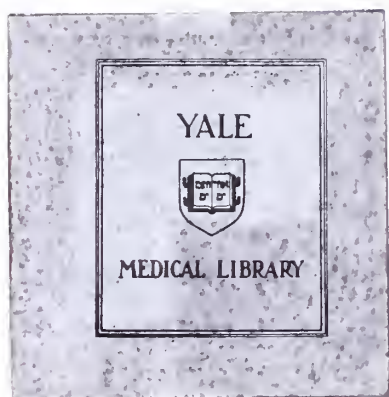




THE FEAR OF NEEDLES IN CHILDREN

David Gary Fassler

YALE UNIVERSITY
SCHOOL OF MEDICINE
1982



Permission for photocopying or microfilming of "

The Fear of Needles in Children "

(Title of thesis)

for the purpose of individual scholarly consultation or reference is hereby granted by the author. This permission is not to be interpreted as affecting publication of this work or otherwise placing it in the public domain, and the author reserves all rights of ownership guaranteed under common law protection of unpublished manuscripts.

David Fessler

J Fessler

Signature of Author

5/17/82

Date



Digitized by the Internet Archive
in 2017 with funding from
Arcadia Fund

<https://archive.org/details/fearofneedlesinc00fass>

THE FEAR OF NEEDLES
IN CHILDREN

by

DAVID GARY FASSLER

Class of 1982

A thesis submitted to the
Faculty of the Child Study Center
Yale University School of Medicine
in partial fulfillment of the requirements for the
Degree of Doctor of Medicine

Parenteral administration should be avoided whenever possible, since needle penetration may easily lead to unfriendly relations between patient and doctor or nurse.

Garrod, 1974
in Diseases of Children

Your own assurance to the child that painful treatment will not hurt will subsequently convince him that you are either a fool or a rogue and rob him of any confidence he may have had in you.

Harland, 1960

Lots of grown-ups tell children to watch them instead of the shots. I'd rather watch to see what's going on. I'd rather know what's happening. It's not scary if you know. Kids get worried when they don't know what's going on. The doctors and nurses often say "Oh, it will take only a minute. It'll go by so fast you won't notice it. Just a little mosquito bite." Well, it isn't a mosquito bite! I'd much rather watch and know. If it goes on too long, like taking blood sometimes, you do get worried. The doctors and nurses should explain everything that's going to happen so kids won't get worried.

advice of a 9-year-old boy

ACKNOWLEDGMENTS

This project would not have been possible without the interest and eager participation of the pediatric nursing staff of the orthopedic division of Boston Children's Hospital. I would also like to acknowledge the generous assistance and encouragement of Dr. Myron Belfer and Dr. Gerald Koocher who went out of their way to make my time in Boston a most meaningful and productive experience.

Throughout medical school, Dr. Melvin Lewis, Dr. Albert Solnit, and Dr. Morris Wessel have aided in the development of my interests and activities with their support, encouragement and friendship. I would like to particularly thank Dr. Lewis for the time, attention and helpful suggestions which he provided as my advisor during the writing of this thesis.

Many of the thoughts and concepts in this thesis were first explored with Nancy Wallace and Dana Alpern, both of whom seem always willing to listen to my half-formulated ideas and speculations. I would also like to thank Dr. Lori Brush and Dr. Carol Lynch who showed me both the rewards and the frustrations of research during my time as an undergraduate at Wesleyan.

No undertaking of this type is possible without the support and patience of friends and family. Special thanks to Brian and Saul, who fed and sheltered me during my summer data

collection in Boston; to Jed and Penny, who fed and tolerated me during my winter writing by the fire in Stony Creek; to my father, who showed me the joy of working with people and taught me to ask questions; to my mother, who kindled and encouraged my interest in children; and to my sister, whose sense of humor helps keep life in perspective.

For their expert clerical assistance I am very grateful to Ms. Mary Ann Williams and Ms. Myrtle McLean.

Finally, I wish to thank the children who shared the thoughts, feelings, drawings, stories and trust which made this project possible.

TABLE OF CONTENTS

	Page
Chapter I. Introduction	1
General Background	1
Etiology: The Question of Pain	7
Review of Related Research and Methodology	12
Evaluation of Intervention Techniques	28
Evaluation of Assessment Techniques	29
Selection of Experimental Techniques	31
Hypotheses	33
Chapter II. Method	35
Subjects	35
Measuring Instruments	35
Experimental Method	37
Chapter III. Results	40
Chapter IV. Discussion	51
Analysis of Results	51
Clinical Evaluation	55
Implications	94
Chapter V. Summary	97
References	100

	Page
Appendix A: Letter to Parents	108
Appendix B: Nurse Rating Scale	111
Appendix C: Children's Book Illustrations Depicting Injection	113
Appendix D: Needle Poem	116

LIST OF FIGURES

	Page
Mean Values and standard errors of the Nurse Rating Scale scores for the Experimental and Control populations at consecutive injections:	
Figure 1 Fear	41
Figure 2 Cooperation	42
Figure 3 Anxiety	43
Figure 4 Verbal Protest	44
Figure 5 Physical Protest	45
Figure 6 Verbal Expression of Pain	46
Figure 7 Physical Expression of Pain	47
Figure 8 Mean values and standard errors of heart rate for Experimental and Control popula- tions at consecutive injections	48
Figure 9 Mean values and standard errors of Hand Pressure Pain Index for Experimental and Control populations at consecutive injec- tions	49

LIST OF TABLES

	Page
Table 1 Distribution of Age and Sex Among the Experimental and Control Groups	36

CHAPTER I

INTRODUCTION

Children experience considerable anxiety, fear and pain in association with needles. Injections and blood tests are often the most traumatic aspects of a visit to the doctor or a hospital stay. The sight of a needle, or the mention of procedures in which they are utilized, can elicit dramatic reactions and heroic attempts at avoidance by young children.

What is it about needles that makes them so frightening? Physical pain undoubtedly contributes to the fear, although throughout the course of childhood, children experience many other, more painful events with less anxiety. The appearance of the needle, misunderstandings concerning its purpose, or feelings related to fears of mutilation may heighten the intensity of children's reactions. This study will explore children's depictions and feelings about needles, investigate the etiology of their fears, and assess the effectiveness of an intervention program aimed at reducing the anxiety associated with procedures involving needles.

General Background

The fear of needles in children has been described clinically by many authors.

Webb (1966) reports observing a 5-year-old boy who "jumped out of bed, lay down on the floor and wrapped his arms and legs around the bedpost" when presented with an injection by a student nurse. She identifies several factors which may contribute to the child's reaction, including: attitude of the nurse and parents, fear of the unknown, and fear of pain. She describes a successful blood-drawing from a 3-year-old by a patient and understanding laboratory technician.

Brandt et al. (1972) note the universality of children's dislike for needles. These authors stress the degree to which the child's reaction depends on his/her developmental stage and previous experience. In addition to encouraging patience in the approach to the child, cognitive preparation, and participation, these authors discuss the contribution of skillful site selection and administration to the reduction of pain.

The prevalence of childhood needle fears is further documented in a study by Menke (1981) on children's perceptions of stress in the hospital. A projective card game was utilized to evaluate responses to twenty stimuli. In a sample of 50 children ranging in age from 6 to 12, the hypodermic needle was most often identified as stressful (86%). The next most stressful hospital items were doctor (36%), food (36%) and hospital gown (32%). Interestingly, the response to hypodermics did not vary with degree of pre-hospital preparation or length of hospitalization.

The intensity of children's reactions to needles and the difficulty experienced by medical personnel in accepting such feelings is evident in an account provided by Petrillo and Sanger (1972). They describe a pediatric nurse who found it necessary to stop a child's needle play. She offered the following explanation:

Adam jabbed the doll's head, abdomen and back repeatedly. The look of hatred on his face scared me. He wouldn't play nicely so I had to take away the equipment.

Lewis (1978) and Fassler and Wallace (1982) have demonstrated the diversity of children's fear of needles through drawings and stories. Based upon extensive experience with the creative productions of hospitalized children, Lewis (1978) notes:

Among all possible medical procedures encountered during a hospitalization, injections remain prominent as a separate, critical event for most children ... it is as though this relatively simple event symbolizes the wide range of experiences and emotions involved in a hospital stay.

Kassowitz (1958) argues that children's responses to needles can be used as an overall indicator of emotional maturity and development. He states that emphasis should not be placed on the negative connotations of encounters with needles, "anxiety, fear, defense." Instead, he suggests that attention be concentrated on the increasing development of positive responses, "self-control, pride, showing off, toughness." By monitoring the changes in a child's behavior with needles, Kassowitz maintains that one can observe the "progress

toward maturity" through the emergence of "controlled psychodynamic performance."

Following an informal survey, Kassowitz concludes that such "self-control" as manifested by docile, compliant, cooperative behavior begins to emerge between 4 and 5 years of age, and by age 10, fewer than 20% of children display even slight reluctance or fear in association with needles.

In addition to the psychological ramifications for the individual child, evidence suggests potential consequences to the detriment of public and personal health when fear of needles persists into adulthood.

Agras et al. (1969) found an incidence of fear of needles of approximately 140/1000 among 20-year-olds. Oswalt and Napoliello (1974) have noted that 97% of the U. S. population does not volunteer to donate blood. At this level, blood procurement by the Red Cross is 25% below that required to meet the need. In a study on the motivations of donors and non-donors, these researchers found that 97% of non-donors cited fear of the needle as the cause of their reluctance to donate blood.

As with blood donation, most adults who experience fear of needles attempt to avoid situations where needles may be encountered. Such resolution of the fear may lead to a decrease in attention to preventative health care, and possible delays in obtaining necessary treatment. As noted by Taylor et al. (1977), "phobias associated with minor medical procedures or apparatus such as needles and intravenous

catheters can be a nuisance and even life-threatening when they present an obstacle to a necessary surgery or diagnostic procedure."

Particular attention to the problems posed by the fear of needles has come from individuals involved in the dental care of children. Sorenson and Roth (1973) have provided the following distressing scenario depicting the administration of injections to children in dental settings:

The injection of the local anaesthetic for the apprehensive child is often accompanied by forcible restraint. This method requires the dental assistant to hold the child's hands and feet while the dentist steadies his head all the while endeavoring to keep the mouth open and directing the needle to the proper injection site. This experience is disconcerting to all participants. The dentist is fatigued and upset; the child is even more reluctant to return for another injection in the future; and the dental assistant, worn out from restraining a struggling child in the chair, mentally questions the "professionalism" of the office.

Bernstein et al. (1979) studied a college student population with self-reported high or low fear of dentistry. Using a questionnaire, they found that 35% of the high fear and 11.1% of the low fear subjects described fear of injections in dental settings. These authors maintain that a significant proportion of dental fear may in fact be due to fear of needles. They offer the following speculation:

In cases where early dental visits simply initiated a fear of injections or provided an arena for the display of needle-related anxiety previously learned in other (e.g., medical) contexts, "fear of dentistry" may

actually be a misnomer until conditioned emotional arousal has spread to other aspects of the dental situation.

Consequently, these authors suggest that dentists and assistants could play a valuable role in preventing dental fear through judicious handling of injection situations.

The extreme significance of fear of needles in dental situations was demonstrated by Kleinknecht et al. (1973) using a self-report dental fear scale with students aged 12 to 21. These researchers found that the sight and sensation of a needle received the highest fear ratings of the fifteen stimuli investigated. These events were rated as more fearful than seeing, hearing or feeling the drill, feeling as if you will gag, or feeling pain even after anaesthetic injection. This result was consistent across all age groups.

These authors note that the sight of a needle was rated nearly as fearful as the actual sensation associated with its use, suggesting "that some fear conditioning has taken place, so that the actual stimulus--feeling the sensation--is no longer needed to produce fear reactions."

In an attempt to reduce the fear of dentistry, these authors recommend improved preparation and psychological intervention, and the reduction or elimination of the use of needles through increased utilization of alternative techniques of anaesthesia administration.

In a talk to pediatric dentists, Harland (1960) explained the importance of devoting time to the psychological preparation of children as follows:

It may be argued that you cannot afford time for this sort of preparation. On the other hand you may not be able to afford the time needed to get a difficult child under control every time he needs treatment, and the approach suggested above may be more economical of time in the long run. In any case, you are treating the patient, not just his teeth, and have a responsibility to insure that the child suffers no avoidable emotional damage as a result of your treatment.

Etiology: The Question of Pain

What makes encounters with needles so frightening for most young children and many adults? One must first consider an obvious observation: they hurt. Dislike of pain undoubtedly contributes to the negative response.

Pain, however, is a complex phenomenon. Throughout history, the medical profession has attempted to understand and alleviate pain. We respond with particular distress to a child in pain. Perhaps the insult appears greater due to the perceived defenselessness, innocence and vulnerability of the young.

A number of interesting studies have demonstrated the influence of experience, expectation, anxiety and cognitive understanding on pain perception.

Melzack (1961) describes the results of experiments on adults suggesting that by giving individuals control over a pain-producing stimulus, a given level of electric shock or burning heat is perceived as significantly less painful than when one has no control over the situation. He concludes that:

Pain is not a fixed response to a hurtful stimulus. Its perception is modified by our past experiences, our expectations and, more subtly, by our culture.

Melzack further notes that pain perception also depends on the degree to which an individual concentrates on the stimuli.

If the subject's attention is focused on a potentially painful experience, he will tend to perceive pain more intensely than he would normally.

This observation would suggest that if an individual is engaged in conversation or given distracting tasks, the perception of pain can be reduced.

Using a questionnaire assessment, Moss and Meyer (1966) demonstrated that supportive interaction between nurses and patients can effectively reduce or relieve pain without the use of pain-relieving drugs. They conclude that such interaction "modifies the patient's perception of pain stimuli."

Similarly, in a study utilizing assessment of patients' verbal behavior by naive raters, McBride (1967) demonstrated that emotionally supportive nursing interaction produced a significant reduction in pain as reported by patients without the use of medication.

In a classic series, Egbert et al. (1963,1964) explored the effect of a brief supportive and informative pre-operative visit by an anaesthesiologist on post-operative pain and hospital course of adult surgical patients. The results indicate that such intervention reduced the post-operative morphine requirements of these patients by half, and they were judged

by their surgeons to be ready for discharge two and seven-tenths days before control patients.

Hill et al. (1952) conducted a study on the effect of anxiety and morphine on the estimation of pain intensity. Electric shocks were administered to adults with past histories of opiate addiction. It was found that under conditions which promote anxiety or fear of pain, subjects tend to overestimate the intensity of painful stimuli. The overestimation can be alleviated with morphine, or by reducing the anxiety through friendly, supportive interaction with the experimenter.

In a study on hypnotic analgesia and anxiety, Shor (1962) found that the manifestations of pain could be eliminated by the use of experimental conditions designed to minimize anxiety. The author concludes that hypnosis can decrease pain only when the incidental anxiety component of the total pain experience is high.

Due to ethical considerations and difficulties in assessment, no experimental studies on the reduction of pain in children are reported in the literature. McCaffery (1971) offers a clinical discussion on the reduction of pain in children without medication. This author concentrates on techniques which reduce anxiety associated with painful events. Emphasis is placed on the nurse's therapeutic relationship with the child and his parents, methods of teaching about pain, distraction techniques, relaxation techniques and desensitization.

Numerous authors have speculated about additional causes

of children's fear of needles. Traumatic experiences in early childhood have often been identified in work with adult needle fears.

Nash (1971) describes a 20-year-old with severe fear of needles whose past history revealed the following:

At the age of 6 he was taken by his mother to a doctor's office for a checkup. At that time, a female nurse in her late twenties surprised him with an injection in his buttocks while he was standing naked and with his back turned. He reportedly screamed and jerked suddenly, causing the needle to break off in his buttocks.

An operation under general anaesthesia was required to find and remove the needle.

In a dynamic context, the fear of needles can be viewed as a fear of being overpowered or attacked. Petrillo and Sanger (1972) have stated, "A child will interpret any sharp object stuck into his body as a brutal attack by a more powerful person." Prugh et al. (1953) postulated that needles represent less threatening, but directly visible objects onto which the child displaces fears of unknown procedures, of separation from parents and of punishment. Schowalter and Lord (1972) note that the almost universal nature of the response "suggests the presence of a powerful and primitive fear of penetration."

A partial integration of these diverse concepts can be found in writings of Anna Freud. In a classic article, "The Role of Bodily Illness in the Mental Life of Children," Freud (1952) notes that any violation of bodily integrity may

"serve as a focal point for the activation, reactivation, grouping and rationalization of ideas of being attacked, overwhelmed and (or) castrated."

In exploring the role of pain in the child's response to hospitalization and medical procedures, Freud offers the following observation:

Parents and others who deal with young children comment frequently on the remarkable individual differences in children's sensitiveness to bodily pain; what is agonizing to one child may be negligible to another. The analytic study of such behavior reveals as different not the actual bodily experience of pain, but the degree to which pain is charged with psychic meaning.

This view of apparent variation in pain perception is quite consistent with the previously described thoughts advanced by Melzack (1961).

In further discussing the meaning of pain to children, Freud explains:

So far as his own interpretation is concerned, the child in pain is a child maltreated, harmed, punished, persecuted, threatened by annihilation.

Thus, it is suggested that the child may view the mere experience of pain as a punishment.

The role of past experience is acknowledged as follows:

Pain augmented by anxiety...even if slight in itself, represents a major event in the child's life and is remembered a long time afterward, the memory being frequently accompanied by phobic defenses against its possible return.

This explanation also provides some basis for understanding the extreme behavioral manifestations of adult needle fears

described in the literature.

Based upon the diversity of children's experiences, constitutions and emotional environments, it seems likely that a variety of factors may contribute to the development of a fear of needles.

Review of Related Research and Methodology

Previous attempts to effect reductions in the fear of needles have predominantly focused on the use of behavior modification techniques. One such approach is systematic desensitization. Utilizing this modality, a hierarchy of stimuli and events is constructed based upon the patient's specific fears. Patients are then aided in coping with successively more stressful items until the entire hierarchy can be tolerated without experiencing anxiety.

Such a treatment approach was utilized by Nash (1971) in the case of a 20-year-old male Army recruit who demonstrated an extreme fear of needles. When approached with a syringe, he threatened to kill his sergeant if forced to submit. The patient was successfully treated with a program of desensitization lasting for six 15-minute sessions over a two-week period. He progressed from knowing a syringe was in a desk drawer to rubbing the point against his own naked arm. At the conclusion of the treatment he was able to receive an injection "without undue anxiety." No follow-up is reported on this patient.

Although such an approach appears to be successful with some people, the extent of emotionally charged material under-

lying these fears suggests that more comprehensive treatment may be needed.

Wynne (1974) describes a 19-year-old Air Force enlistee whose extreme fear of needles prevented necessary restorative dental work. He would clamp his mouth shut, cry out, struggle, and hit the clinical personnel. The patient was treated unsuccessfully with Valium, Nembutal, general anaesthesia, psychotherapy and relaxation prior to his therapy with systematic desensitization. After twelve 30-minute sessions over six weeks, the patient was able to tolerate an injection of local anaesthetic in preparation for dental treatment, although with clenched fists and tightened shoulder muscles.

Turnage and Logan (1974) describe the successful use of systematic desensitization to treat an unusually extreme fear of needles in a young woman with a complicated emotional history.

Mrs. J, a 27-year-old school teacher, had a hypodermic needle phobia of about 22 years duration. The apparent etiology of this phobia was that at the age of 2 she had received daily injections for about four months for an intestinal disorder. At 5 she was told in vivid detail how violently she had reacted to these daily injections. Upon receiving routine inoculations prior to entering school at this time, she reacted in the same violent manner as at the age of 2, and had to be physically restrained by her mother and a nurse. Thereafter, at each injection that she received she fought violently and had to be physically restrained. For the blood sample necessary for her marriage certificate, her husband, a medical laboratory technician, forced her into an immobile position by twisting her arm behind her back.

The patient was seen for ten sessions, during which she was encouraged to deal with increasingly stressful stimuli related to needles. She was also given "assignments" for practice at home with her husband. At the last session a blood test was arranged which her husband performed.

Although she began crying when the needle penetrated her skin and for about one minute thereafter, she remained completely immobile. She reported that the needle had not hurt as much as she had expected it to, and that she regarded her phobia as eliminated.

As evidence of the efficacy of this treatment, it is noted that "at six and ten month follow-ups, she reported no hints of relapse, and had even worked (voluntarily) in the inoculation clinic at her school." These authors conclude with the somewhat undemonstrable assertion that "the dissipated fear of hypodermic needles had not been 'substituted' by any other problem."

One must wonder whether the use of the patient's husband as the therapeutic vehicle in this situation may not have exacerbated underlying issues of attack and control, and fears of restraint and penetration. It is also important to realize that the "cure" may well have resulted from the fact that this was the first time in twenty-five years that the subject was presented with a needle in a safe situation with a guarantee that she would not be restrained.

Although the application of systematic desensitization successfully "alleviated" the patient's fearful response, the degree to which emotionally powerful events are ignored is

somewhat distressing. A study by Hafner (1976) suggests that such an end-behavior oriented view of a phobia may be detrimental therapeutically. In a study of 39 agoraphobics treated with in vivo desensitization, 26 suffered fresh symptom emergence during follow-up.

A case of symptom substitution with direct reference to fear of needles has been reported by Hsu (1978). A 24-year-old man with a long history of needle phobia was successfully treated with a desensitization program lasting six weeks. At the conclusion of the therapy, the patient could "watch medical programs on television and listen to people talking about illnesses and operations." He was also able to visit the dentist for the first time in sixteen years, remaining calm and comfortable throughout the encounter.

Although his needle phobia appeared to have been dissipated, he began to experience attacks of dizziness, palpitations, abdominal cramps and diarrhea, all in association with subway travel. He also reported a nightmare about lying on an operating table in a large empty hall and being approached by a surgeon holding a knife. The patient subsequently began to experience attacks in association with traveling on buses or trains or being in crowded places. He came to avoid traveling, parties and bars. Clearly, treatment of his needle phobia through desensitization without exploring the etiology of his symptoms proved a less than adequate approach to his condition.

Katz (1974) describes the successful use of single

session systematic desensitization employing directed visual imagery with an 18-year-old male renal patient who developed an "intense fear of dialysis" following preparation by a "relatively inexperienced student technician."

Although the intervention apparently removed the undesirable behavior, the author suggests that the development of the symptom may have been avoidable.

It is possible that this patient's phobia might have been prevented with better planning and preparation for his first dialysis treatment. For example, misconceptions he may have had about his pending treatment could have been corrected by thorough explanations of what was being done and why.

As is not unusual for advocates of systematic desensitization, this author notes in passing the rather intense emotional environment in which the patient's behavior arose.

Except for his intense fear of dialysis, which had caused him considerable embarrassment, the patient was adjusting well to series of recent hardships, including the death of his father from renal failure.

One must wonder to what extent these emotional factors may have contributed to the patient's symptom formation. The long-term consequences of end-behavior treatment without addressing such issues remain to be demonstrated.

Related to classical "desensitization" therapy is "reciprocal inhibition" described by Wolpe (1958). This approach teaches the patient to replace a maladaptive response, such as a needle-phobic behavior, with an adaptive one such as muscle relaxation. Various forms of directed visual imagery are often employed to enhance the relaxation. This

theory maintains that the patient cannot experience relaxation and anxiety simultaneously. Thus the treatment weakens the bond between the anxiety-producing stimulus and the anxious response.

Savide et al. (1978) utilized such an approach in the treatment of a 13-year-old mildly retarded girl with a needle phobia associated with dentists and doctors. When confronted with an injection for dental anaesthesia, the patient "cried, kicked, screamed, put her hands over her mouth and assumed the fetal position." In twenty-four 45-minute sessions held over two months, the patient was taught to visualize progressive steps in a hierarchy of anxiety-evoking situations involving the process of anaesthesia, focusing upon the anxiety-producing stimulus of needles. Deep muscle relaxation was maintained throughout the visualizations. The goal of the treatment was for the patient to be able to internally visualize the process of dental anaesthesia without experiencing anxiety.

After extensive therapy, and with the additional support of a token economy system and Valium, 10 mg p.o., before each session, the patient was able to tolerate some restorative dental work.

Interestingly, the patient is reported to have experienced an outburst in the course of treatment not associated with needles. The authors speculate that this may have been due to the patient's underlying need for attention. They postulate that "perhaps too much emphasis had been placed on

the needle phobia and desensitization therapy, which was not designed to take care of the need for attention." They acknowledged that the partial success achieved with the desensitization program may have resulted from the incidental increase in social reinforcement afforded the patient.

It would seem to follow that the lack of total success with this patient supports the need to explore the underlying "emotional meaning" of a phobic behavior to a particular patient. These authors, however, offer an alternative explanation, concluding that their observations "suggest that systematic desensitization is different for the handicapped dental patient."

A rather simplistic approach to the utilization of reciprocal inhibition in dental work with children is offered by Rosenberg (1974). He provides the following advice:

Teaching an incompatible behavior is an effective means of eliminating an undesirable behavior. If a child is taught (through reinforcement) to keep his hands in his lap, he cannot possibly grab your arm during an injection procedure. Keeping his hands in his lap is incompatible with grabbing your arm.

An alternative treatment modality based upon the principles of behavior modification is offered by Fazio (1970). This author describes the use of implosive therapy in the treatment of a needle phobia. In contrast to the presentation of stimuli in a manner designed to minimize anxiety, implosive therapy utilizes the presentation of stimuli at maximal anxiety-eliciting levels. The author describes a 20-year-old girl with a morbid fear of needles dating back to fifth grade.

At the time of consultation her phobic response (dizziness, palpitations, hyperventilation and occasional fainting) was also elicited by earrings, knives, darts, or conversations about operations. The patient also reported a growing concern about losing her mind and explained that she would rather die than have an injection.

The patient was treated through confrontation aimed at forcing her to visualize and respond to intensely frightening fantasy events as constructed and directed by the therapist. The patient was seen for twenty-three sessions, often focusing on sexual, violent, sado-masochistic, and bloody visualizations, all aimed at eliciting high anxiety responses. At one point, the patient was instructed to visualize being raped by a school janitor and impaling him for revenge. In keeping with the principles of implosive therapy, no escape or avoidance from these visualizations was allowed.

If a particular scene is in fact critical to a patient's problem, a great deal of anxiety will be elicited. Crying, sobbing, refusals to continue, covering the ears, etc., are regarded as attempts to escape and/or avoid the anxiety-producing material. The patient must be kept in the presence of the imagined stimuli as long as possible in order for the conditioned anxiety to extinguish.

After twenty sessions, an attempted blood test failed when the patient re-experienced the constellation of paranoid concerns which had paralyzed her previously.

After eighteen weeks the patient was reportedly able to receive an injection without fainting. One year follow-up by

verbal report revealed no recurrence of symptoms.

Although implosive therapy as described in this study may well have alleviated the patient's fear of needles, one must wonder what effect the evocation (and introduction by the therapist) of such emotionally charged images and ideas would have on an individual who is apparently already emotionally fragile. This therapeutic approach raises powerful issues for the purpose of dissociating them from anxiety reactions without dealing with the psychological content and implications. The long-term effects of such treatment remain unclear. No controlled research or follow-up studies are available to resolve these concerns.

An interesting modification on the use of visual imagery with needle-phobic children in dental situations has been reported by Ayer (1973). This technique attempts to identify nonanxiety-eliciting visualizations unrelated to the frightening stimuli. In the three case histories described, children were told to close their eyes and open their mouths while imagining yelping dogs (presumed to have positive associations for these children). The clinician continued talking and encouraged the child to intensify the yelping. Children were told to hold the hand of an assistant and were promised that they would not be restrained. They were constantly reinforced verbally for "the fine job they had done." After the second appointment, they were given plastic syringes to take home, and were praised in the presence of their parents for their good behavior. Subsequently, children were sent letters

complimenting them on their "cooperativeness in helping make the task of the dentist easier." Follow-up contact with the parents indicated that the children were no longer fearful of injections.

The author concludes that the fearful response was eliminated by providing the children "with stimuli which were incompatible with anxiety--that of imagining as intensely as possible a pleasant scene while they were getting the injections. This permitted them to associate a pleasant experience with a previously fearful one."

It is necessary to point out that the intervention described above incorporates increased attention, social reinforcement, distraction, increased control by the child over the situation, decreased sense of attack, desensitization through manipulation of the syringe, development of mastery, and positive reinforcement. Although it is encouraging that these children appear to have benefited from the total program, it is not at all evident that they did so through the implementation of visual imagery. Unfortunately no controlled study has explored this issue.

One of the difficulties encountered in the utilization of desensitization and visual imagery is the relatively long duration of therapy necessary to effect change. Bandura et al. (1969,1975) have described a program of participant modeling aimed at producing rapid elimination of phobias. Ferguson et al. (1976,1978) have described the use of this approach with two adult patients in the treatment of needle phobias. Both patients were seen for one hour by a therapist who

introduced a tray of blood-drawing, intravenous and injection paraphernalia. The therapist handled each item and then encouraged the patient to do so. Eventually, the therapist rubbed a bare needle on his arm and instructed the patient to do the same. Both patients responded well to the therapy and demonstrated reduced fear of needles following treatment. Informal follow-up indicated no recurrence of symptoms.

In their conclusion, the authors stress that these techniques are appropriate for use with patients exhibiting isolated phobias with no other psychiatric symptoms. In addition, they note that many fears can be prevented through "careful instructions to the patient about the nature of the procedure, inquiring about his fear and understanding of the procedure, and generally alleviating anxiety by support, education and reassurance."

The importance of parental support during stressful encounters with needles was demonstrated by Frankl et al. (1962) in work on behavior in dental settings. Using a 4-point rating scale, observers evaluated the behavior of two groups of 56 children seen in a dental clinic. One group was treated with their mothers in the room, while the other group was seen by the dentist alone. The children seen with their mothers had significantly more positive behavioral ratings during encounters with needles for dental anaesthesia than those seen alone. In general, the authors note that the presence or absence of the mother had the greatest impact on children under the age of 4. Somewhat surprisingly, these

researchers found that by the age of 5 "positive behavior was uniform" among the children regardless of the presence or absence of the mother.

In contrast to these findings, several authors have argued that parental presence may complicate injection procedures and exacerbate negative behavioral responses (Carpenter, 1941; Kassowitz, 1958; Webb, 1966; Brandt et al., 1972).

Hypnosis, in conjunction with systematic desensitization, has been utilized in the treatment of needle fears by Daniels (1976). After two sessions, the patient, a 24-year-old male, was able to receive an inoculation without difficulty. However, he experienced frequent relapses characterized by attacks of extreme anxiety requiring repeated desensitization.

The author concludes that the lack of complete alleviation of the phobic behavior was due to the patient's ancillary fear of tissue damage, not addressed in the desensitization hierarchy. He cautions that individuals utilizing systematic desensitization should "include as many objects and situations related to the presenting complaint as possible within the treatment program so that complete absence of tension prevails....during actual encounters with phobic stimuli."

A rather different approach to needles in dental situations has been described by Sorenson and Roth (1973). These authors note that "given thorough attention to appropriate management techniques, the child still may react poorly

to the experience of--or even the thought of--an injection and dental treatment." To avoid such complications, they recommend reliance on nitrous oxide inhalation sedation to reduce resistance and provide an "amnestic shield" for the anxieties activated by conscious perception of the needle.

Although not reporting specific case studies, these authors provide anecdotal descriptions of increased patient cooperation and decreased behavioral problems during dental treatment through the utilization of nitrous oxide.

Although such an approach is undoubtedly successful in securing compliance and relaxation, no evidence is presented to suggest that the children are any less fearful of needles. In fact, such an experience may increase a child's fear of dental/medical situations by exacerbating anxieties about being overwhelmed and attacked while in a helpless state. It is well known from the hospitalization literature that the induction of anaesthesia itself is a highly stressful event for many young children. At this time, no controlled studies have assessed the long-term psychological and physiological consequences of the use of such inhalation anaesthetic agents with young children.

Despite numerous clinical reports describing needle fears in all age groups, only two empirical studies dealing specifically with the fear of needles in children have appeared in the literature. This is somewhat surprising, since it would appear from the case histories and adult work cited above that the roots of many, if not most, adult needle

phobias can be identified in early childhood.

Shapiro (1975) conducted an intriguing study on the fear of needles in 12-year-old Israeli girls using heart rate, finger sweat, and self-reported fear. She assessed two groups of children, kibbutz and urban, before, during and after an injection. Her study demonstrated increased heart rate and self-reported needle avoidance immediately before receiving the injection. Finger sweat did not prove a useful measure, presumably due to high ambient temperatures at the time and location of the study. Interestingly, the kibbutz girls had significantly smaller heart rate elevations and reported fear less often than the urban girls. The author also notes:

Not a single kibbutznik held back, cried or screamed during the injection, while 26% of the urban girls did. Most kibbutz girls watched the needle penetrate their skin, and four kibbutz girls smiled pleasantly while getting their shots.

The author postulates that these findings may reflect differing attitudes in the children's communities.

Kibbutzim made it a policy to educate their children to look upon nurses and medical personnel as friends, and this may be responsible for the observed physiological and behavioral differences.

Although an interesting investigation, this study does not address the nature or meaning of children's fear of needles. Nor does it offer suggestions aimed at reducing such fear when encountered in the urban group. It does, however, lend support to the idea that environment and cultural

attitudes can affect children's reactions to needles.

Only one previous study has attempted to make a controlled investigation of the efficacy of specific intervention in reducing fear of needles in children.

Fernald and Corry (1981) studied empathic versus directive preparation for blood test in 39 children between the ages of 3 and 9. The empathic group received emotional support from the laboratory technician at the time of blood drawing, while the directive group was given instructions in an impersonal manner. Each child was then observed for five categories of responses and asked six questions about his or her reactions to being stuck. These authors found that with directive preparation, 52.6% of the children cried in anticipation of the needle as compared to 10% of the empathic group. The directive group also exhibited more negative behavioral responses (negative remarks, wincing, refusal to comply) and post-procedure anger as assessed by these authors.

Somewhat distressingly, 47.4% of the directive group indicated that they felt that the technician had intentionally tried to hurt them. None of the children in the empathic group expressed such concerns.

The authors conclude that:

The superiority of the empathic preparation demonstrated here suggests that it might be wise to provide consultation and training in the use of warmth, support, openness and honesty in patient interaction to medical personnel who administer even routine procedures such as needles to children.

Several methodological flaws complicate this study. Firstly, the intervention described cannot accurately be considered as preparation, as it takes place coincident with the feared procedure. As many children feel vulnerable and threatened at the time of an impending procedure, it would seem that preparation should take place in a safe, secure and trusting environment.

Unfortunately, this study does not appear adequately controlled to support the conclusion that an empathic approach reduces the anxiety children experience in association with needles. In this study, the directive condition appears unnaturally cold and authoritative. Children were told "to be big, brave, not cry and hold still. In a minute I'm going to stick you. I want you to stay still and not move because if you jerk your arm or flex, I may have to stick you again." Clearly this last statement could activate fears of attack, punishment and loss of control, all known to accentuate children's fears of hospital procedures.

Thus, without a non-intervention control group, this study is unable to demonstrate conclusively the superiority of empathic preparation.

Lastly, the empathic intervention makes no attempt to explore the child's understanding of the procedure, to provide accurate information, or to correct misconceptions. Instead, the technician merely states presumed concerns, without accounting for differences in age, past experience or level of cognitive understanding.

In a previous study on children hospitalized for tonsillectomies, this author (Fassler, 1980a) has demonstrated that while emotional support alone is capable of producing significant reductions in pre-operative anxiety, information and emotional support will produce significantly greater reduction in anxiety as measured by questionnaire and projective techniques. Somewhat surprisingly, although numerous authors have noted the importance of such cognitive preparation (Webb, 1966; Plank, 1971; Petrillo and Sanger, 1972; Brandt et al., 1972; McCaffery, 1971), no study on the fear of needles has been designed utilizing this modality.

Evaluation of Intervention Techniques

As the above studies indicate, there are numerous approaches to the reduction of children's fear of needles. The efficacy of these approaches has been demonstrated to varying degrees. Systematic desensitization appears to effectively reduce children's fear of needles. However, such treatment requires rather extended therapy. Additionally, failure to address the underlying issues may lead to symptom substitution as described by Hsu (1978) or re-emergence of the phobic response (Hafner, 1976).

Although Ayer (1973) reports successful administration of dental anaesthesia to children with the use of directed visual imagery, it seems unlikely that young children will close their eyes and sit passively while they receive oral injections. It would also seem that success with this technique would depend heavily on trust between the child and the clinical staff.

Implosive therapy, as described by Fazio (1970) would seem totally unsuited for use with children. In a hospital setting, such confrontation might increase the child's anxiety about hospitalization, illness and procedures involving needles. Participant modeling described by Ferguson et al. (1976,1978) is rapid and apparently effective in work with adult needle fears. However, the literature does not describe the use of this modality with children.

Although these are useful theoretical findings, in the reality of hospital functioning, prolonged desensitization, hypnotists and implosive therapists are not routinely available.

Parental support is of unquestionable importance to all hospitalized children, but the study by Frankl et al. (1962) suggests that maternal presence during injection procedures is most beneficial for children under 4. The effect of maternal presence on the behavior of older children during encounters with needles is a subject of debate in the literature.

The use of nitrous oxide sedation as described by Sorenson and Roth (1973) for all hospital procedures involving needles is both impractical and potentially dangerous. In addition to physiological complications, this approach risks the activation of new, no less potent fears, fantasies and misconceptions related to the anaesthesia.

Evaluation of Assessment Techniques

Behavior Rating Scales. Rating scales in various forms have been frequently employed to assess behavioral change in children.

In the study by Shapiro (1975), the researcher observed the procedure and completed the behavioral evaluation scale. As the research was aware of the child's treatment condition, this approach introduces an unacceptable potential for experimenter bias.

Naive raters unfamiliar with the children under study and their assigned treatment conditions have been utilized in work by Frankl et al. (1962), Johnson et al. (1976), and Herbertt and Innes (1979). This approach has the difficulty of introducing a stranger into the situation with unpredictable effects.

Physiological Measures. Heart rate is a convenient physiological measure frequently utilized as an indication of anxiety in children (Skipper and Leonard, 1968; Edelman, 1970; Shapiro, 1975; Wolfer and Visintainer, 1975). Determination is rapid and noninvasive. The use of finger sweat indices (Melamed and Siegel, 1975; Johnson and Stockdale, 1975; Shapiro, 1975) has been of limited success, and the equipment necessary might well increase the child's anxiety. Plasma cortisol determination, although a potentially accurate measure of anxiety, would be most inappropriate in this setting as it would require subjecting the children to additional procedures involving needles.

Pain Indices. It is evident from the studies by Egbert et al. (1963, 1964) and Shor (1962) that decreasing anxiety can lead to a decrease in perceived pain. However, the quantification of pain, and therefore the demonstration of its reduction,

has proven to be a very difficult task. A self-rating pain questionnaire has been devised and utilized by McBride (1967). However, such instruments are inappropriate for use with children. Nurse rating scales have been constructed relying upon the child's voluntary expression of pain. However, it seems likely that physiological variables as well as chronicity heavily affect the child's expression of pain.

In the work by Egbert et al. (1963,1964), one presumed measure of pain was the amount of narcotic requested. Children, however, are given less control over such determination in hospital settings.

Selection of Experimental Techniques

Based upon evaluation of the above studies, the following techniques were selected for utilization in the present investigation.

Intervention. The present study will evaluate the effectiveness of a single session unified program of intervention, drawing on beneficial aspects of several modalities discussed, in an attempt to effect the reduction of fear of needles in children. The comprehensive intervention program utilized in this study incorporates elements of the following approaches: information, emotional support, desensitization, participant modeling, projective techniques, and correction of misconceptions. The intervention will employ a cognitive approach aimed at enhancing the child's mastery of the fear of needles.

Based upon the experience of this author, many children harbor misconceptions about the need for procedures involving

needles. By providing honest information and correcting misconceptions in an emotionally supportive environment, it is the hypothesis of this study that much of the child's fear can be eliminated.

The intervention will employ the use of drawings, stories and projective play activities to enhance communication and encourage expression of concerns, fears and fantasies by the child. The use of such projective techniques with hospitalized children has previously been described by this author (Fassler, 1977, 1980b). In addition, the intervention will incorporate elements of participant modeling and desensitization by encouraging needle play by the children.

Assessment. In the present study, behavioral evaluation will be provided by floor nurses familiar to the children, but naive as to their treatment conditions. This approach avoids experimenter bias and the potential for some children to experience increased anxiety due to the presence of an additional stranger during an already stressful procedure.

After consultations with medical personnel familiar with the behavior of children in regard to needles, a seven-item rating scale focusing on a range of aspects of the child's response to needles was devised for completion by the floor nurses.

Heart rate determination was chosen as a physiological index of anxiety. This measure was felt to be simple and relatively nondisruptive.

As existing instruments appeared inappropriate for use

with children, assessment of pain perception required the development of a new measure. A method was devised to quantify the suggestion doctors and nurses routinely offer children: "Squeeze my hand." By asking the child to squeeze a ball as hard as s/he can, and then to squeeze as much as a painful event hurt, one is able to measure the respective pressures, form a ratio, and have some indication of "how painful" the child perceived the event to be. One is then able to monitor changes in this perception. This is a non-invasive, nonverbal technique which does not rely on observations by outside raters.

Hypotheses

On the basis of the previous studies cited pertaining to the effectiveness of the selected intervention techniques and the nature of pain perception, the following hypotheses were proposed:

1. Children exposed to the intervention (Experimental Group) will exhibit significant reductions in fear, anxiety, verbal protest, physical protest, verbal expression of pain and physical expression of pain as measured by the Nurse Rating Scale during an injection.

2. The Experimental Group will exhibit a significant increase in cooperation as measured by the Nurse Rating Scale during an injection.

3. The Experimental Group will show a significant decrease in pulse rates immediately before an injection.

4. The Experimental Group will demonstrate a significant

reduction in perceived pain as measured by the Hand Pressure Pain Index.

5. Children receiving no planned intervention (Control Group) will show no significant changes in Nurse Rating Scale assessments, heart rate, or perceived pain as measured by the Hand Pressure Pain Index.

CHAPTER II

METHODOLOGY

Subjects

The subjects selected for this study were 30 children ranging in age from 6 to 9. All were admitted to the orthopedic service of Boston Children's Hospital during the summer of 1979. Children within two days of an operation (pre or post) were omitted from the study. Parental permission for each child's participation was obtained by the researcher using a brief letter explaining the nature of the study (See Appendix A).

Each child was randomly assigned to one of two treatment conditions. Composition of each category was controlled for sex and age (using 2-year intervals). Data on the distribution of age and sex are presented in Table 1.

Measuring Instruments

Three measures were utilized to assess children's response to the intervention. A physiological measure of stress was obtained through the determination of heart rate (radial pulse). Behavioral assessment was provided by nurses naive as to the child's treatment condition. These observers rated the child's behavior during the injection on a seven item, 10 point scale (See Appendix B).

TABLE 1

Distribution of Age and Sex Among the Experimental and Control Groups

Age	Mean	Experimental Group	Control Group
	Standard Deviation	7.40 1.12	7.53 1.13
Sex	Girls	7	7
	Boys	8	8

A measure of perceived pain was devised by quantifying children's hand pressure. A rubber bulb was attached to a 300 mm mercury column sphygmometer (W. A. Baum Co. Inc., Copiague, N. Y.) by a 3 foot length of flexible rubber hose. Children were asked to squeeze as hard as they could (I), as hard as the needle hurt (II), and as hard as they could again (III). The Hand Pressure Pain Index (HPPI) was derived by dividing the perceived pain by the average of the maximal efforts, utilizing the following equation:

$$\frac{II}{\frac{I + III}{2}} = 2(II)/I + III$$

Experimental Method

The researcher introduced himself to the child's parents and explained the nature of the study. Any questions the parents raised were answered. If they elected to participate, the consent form was presented, explained and signed. The parents were then engaged in a brief discussion concerning the child's previous experiences with needles.

Immediately before a routine injection procedure (Injection I), each child's heart rate (radial pulse) was ascertained by the researcher. Following the injection, the child was asked to squeeze a rubber ball "as much as the needle hurt." The child was also asked to squeeze "as hard as you can" twice. The pressure exerted was determined by using a modified sphygmometer and an index of perceived pain was calculated as described (See Measuring Instruments). Nurses naive as to the child's treatment condition were asked

to evaluate seven aspects of the child's behavior during the procedure using 10 point rating scales. Shortly after the injection, half of the children (the Experimental Group) received the following intervention:

The child was read the story, TOMMY GOES TO THE DOCTOR, by Gunilla Wolde (Boston: Houghton Mifflin, 1972). The book deals with hospitalization and contains the depiction of an injection (see Appendix C). After the story, the child's understanding of the reason for the procedure was explored. Any misconceptions were corrected. The child was then asked to draw pictures of "a needle" and of "getting a shot." Fears or fantasies expressed were discussed. Next, the child was read a poem about a child who wanted to give a doctor a shot, only to find out that the doctor was afraid of needles (see Appendix D). Lastly, the child was offered an opportunity to pretend that s/he was a doctor and to give a doll an "injection" using hospital toys and water-filled syringes.

Each child was seen for approximately 45 minutes. Although each activity was performed with every child, specific dialogue and interactions were intentionally left flexible in an attempt to address each child's unique fears and needs.

The children who did not receive intervention served as a control group. Pulse rate, hand pressure and nurse rating assessments were repeated for all children at a subsequent injection (Injection II). Each child was evaluated by the same nurse-rater on both occasions.

After completion of these activities, the children in

the control group also received the full 45 minute intervention in an attempt to insure that all children had an opportunity to benefit from participation in the study.

CHAPTER III

RESULTS

Consistent with the unidirectional nature of the initial hypotheses, data were evaluated utilizing one-tailed t -tests. The mean values and standard errors of the Nurse Rating Scale (NRS) scores are presented in Figures 1-7.

The group which received the intervention (Experimental Group) was found to exhibit significant reductions in Fear $t(28) = -3.16$, $p < .01$; Anxiety $t(28) = -2.43$, $p < .05$; Verbal Protest $t(28) = -2.31$, $p < .05$; Physical Protest $t(28) = -3.15$, $p < .01$; and Physical Expression of Pain $t(28) = -2.23$, $p < .05$ during subsequent injection. The Experimental Group was also found to exhibit significantly more Cooperation, $t(28) = 2.25$, $p < .05$, during an injection subsequent to the intervention. No significant change was demonstrated in Verbal Expression of Pain for the Experimental Group. The Control Group demonstrated no significant changes in NRS scores between Injection I and Injection II.

The mean values and standard errors of Pulse Rate and Hand Pressure Pain Index (HPPI) scores are presented in Figures 8 and 9. The Experimental Group demonstrated significant reductions in Pulse Rate $t(28) = -2.07$, $p < .05$; and HPPI $t(28) = -3.03$, $p < .01$. The Control Group demonstrated no significant

Figure 1

MEAN VALUES AND STANDARD ERRORS
OF NURSE RATING SCALE: FEAR SCORES
FOR EXPERIMENTAL AND CONTROL
POPULATIONS AT CONSECUTIVE INJECTIONS

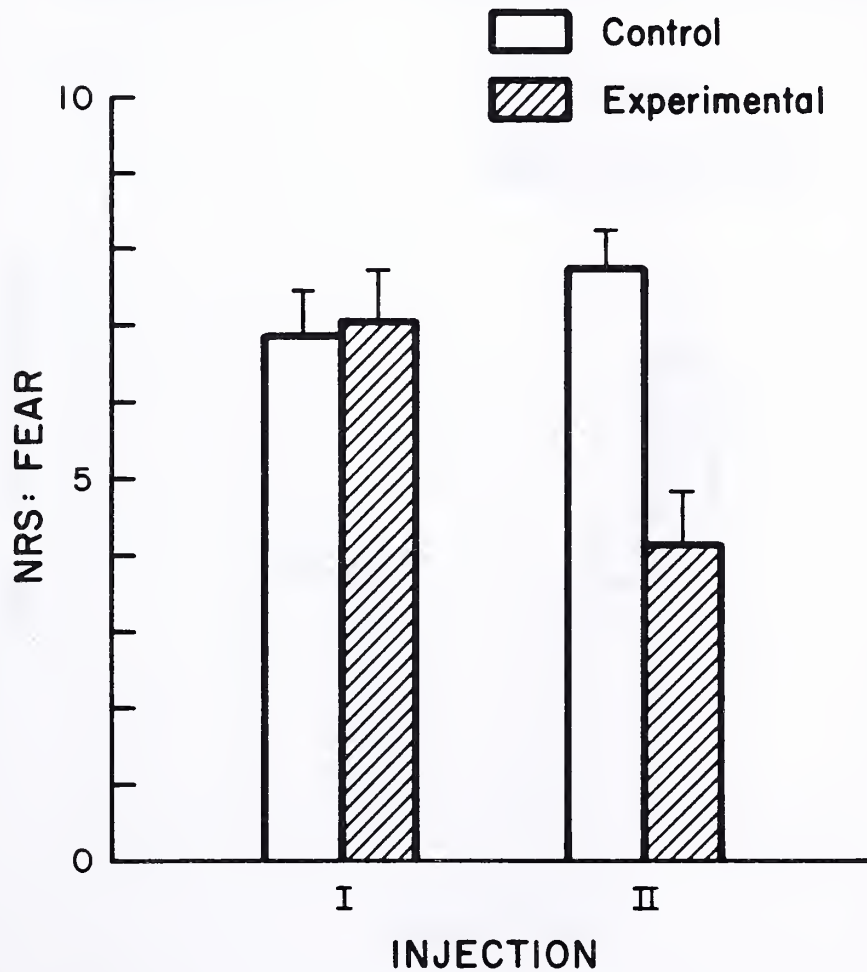


Figure 2

MEAN VALUES AND STANDARD ERRORS
OF NURSE RATING SCALE: COOPERATION
SCORES FOR EXPERIMENTAL AND CONTROL
POPULATIONS AT CONSECUTIVE INJECTIONS

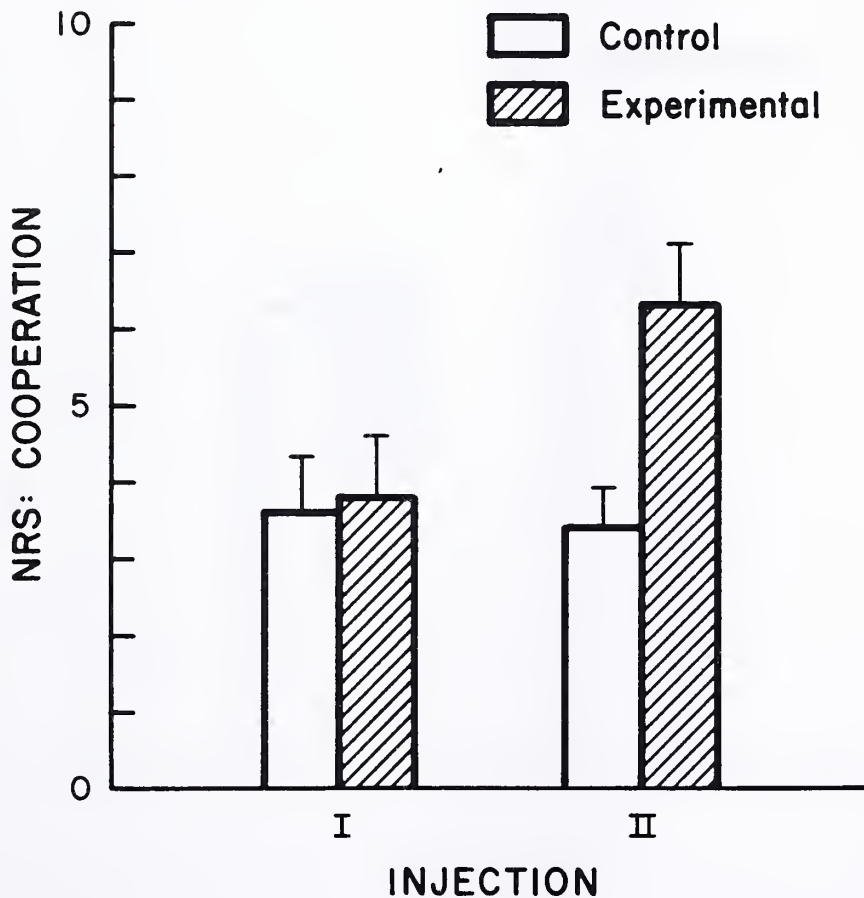


Figure 3

MEAN VALUES AND STANDARD ERRORS
OF NURSE RATING SCALE: ANXIETY SCORES
FOR EXPERIMENTAL AND CONTROL
POPULATIONS AT CONSECUTIVE INJECTIONS

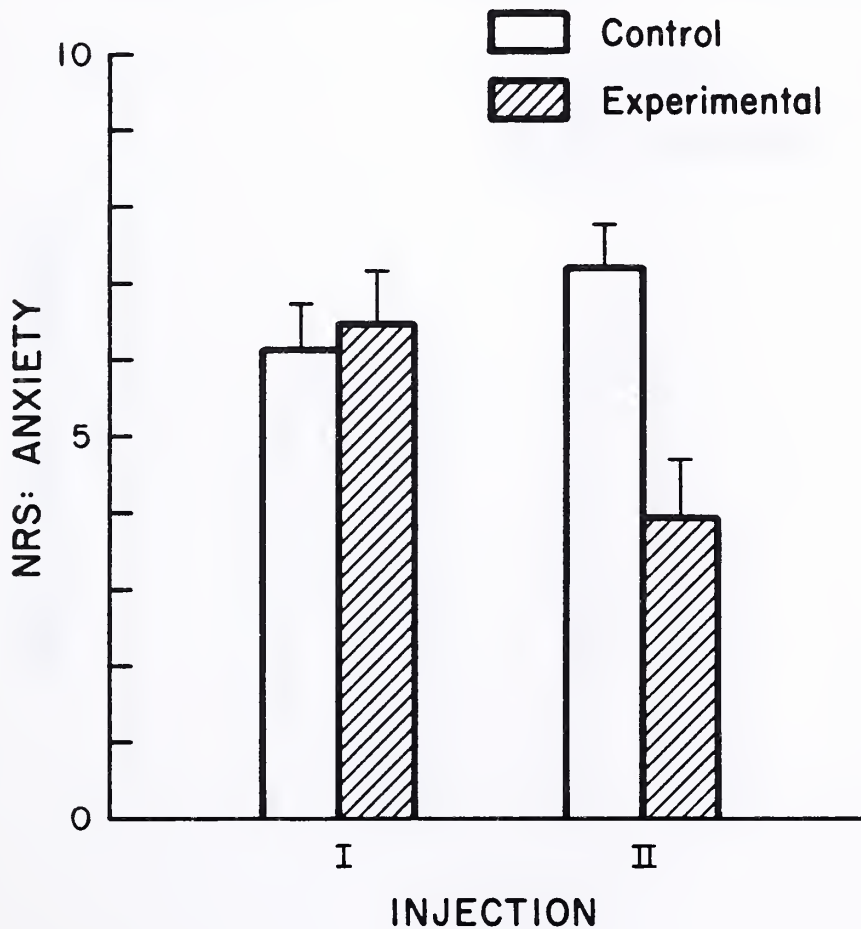


Figure 4

MEAN VALUES AND STANDARD ERRORS OF
NURSE RATING SCALE: VERBAL PROTEST
SCORES FOR EXPERIMENTAL AND CONTROL
POPULATIONS AT CONSECUTIVE INJECTIONS

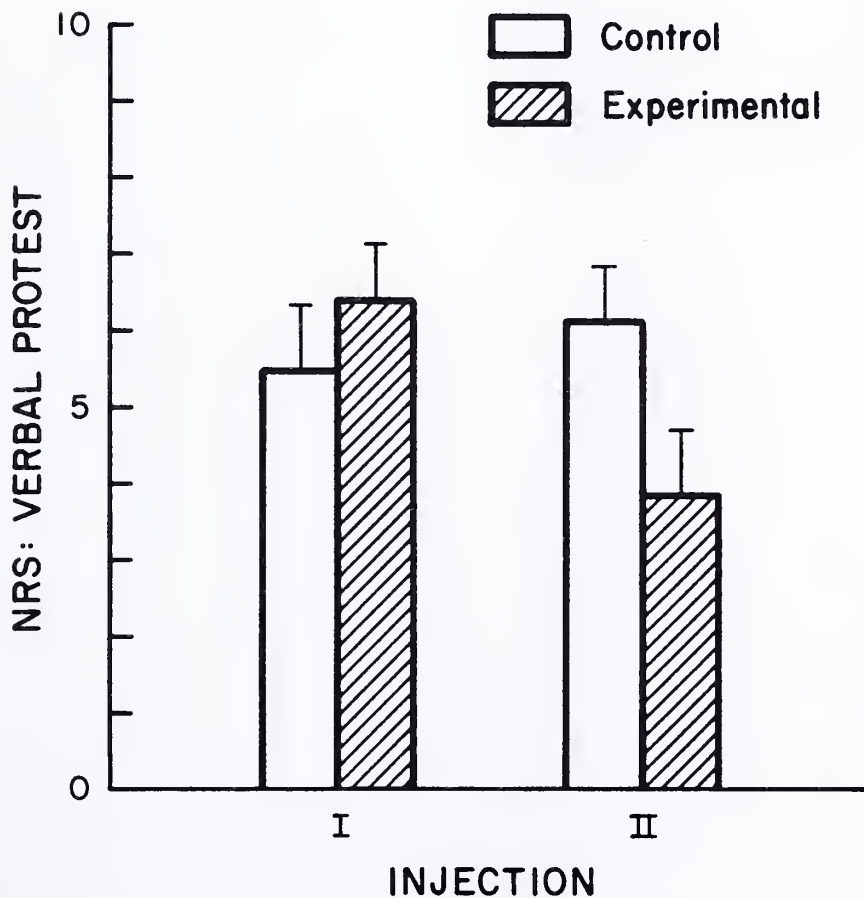


Figure 5

MEAN VALUES AND STANDARD ERRORS
OF NURSE RATING SCALE: PHYSICAL
PROTEST SCORES FOR EXPERIMENTAL AND
CONTROL POPULATIONS AT CONSECUTIVE
INJECTIONS

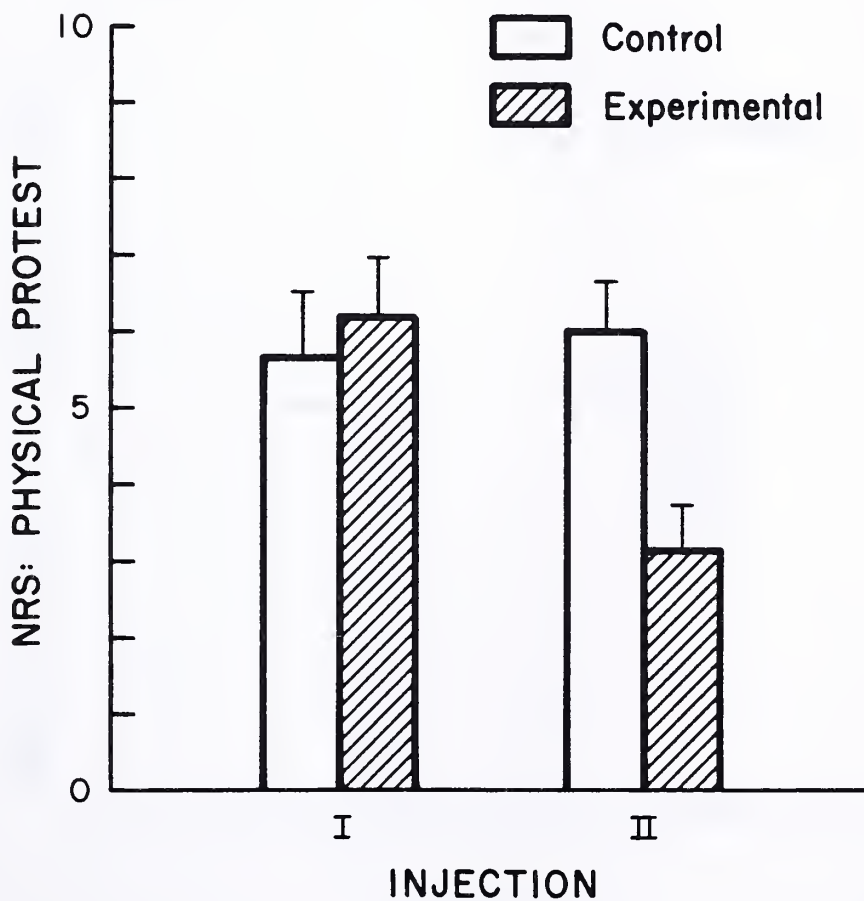


Figure 6

MEAN VALUES AND STANDARD ERRORS
OF NURSE RATING SCALE: VERBAL
EXPRESSION OF PAIN FOR EXPERIMENTAL
AND CONTROL POPULATIONS AT
CONSECUTIVE INJECTIONS

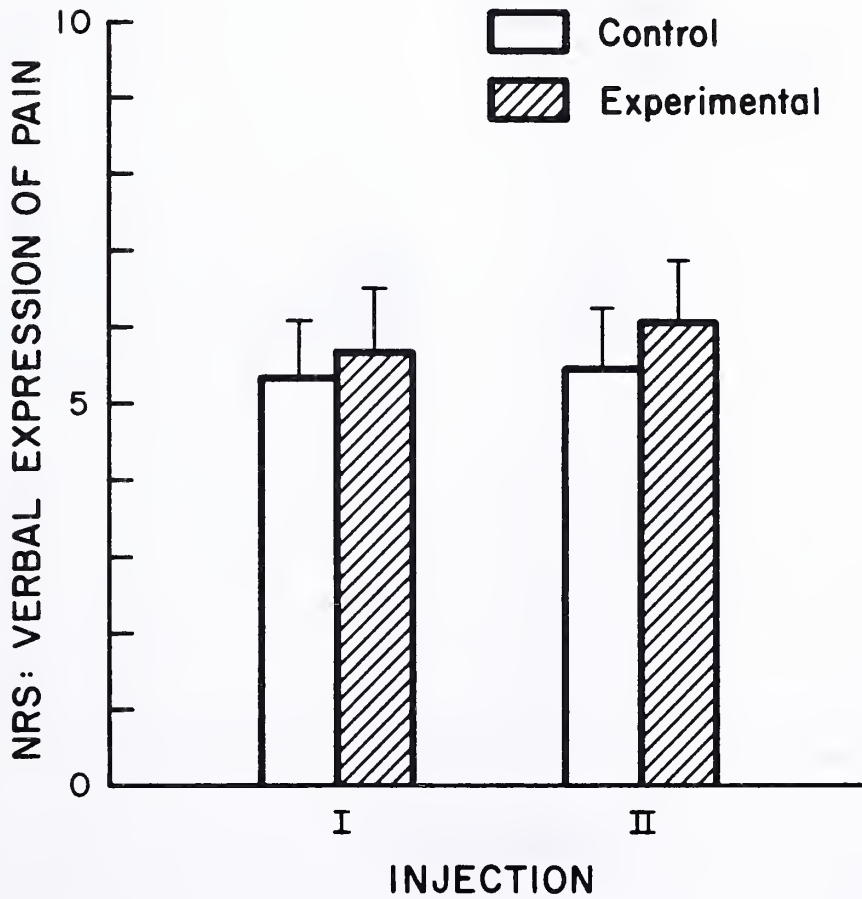


Figure 7

MEAN VALUES AND STANDARD ERRORS
OF NURSE RATING SCALE: PHYSICAL
EXPRESSION OF PAIN FOR EXPERIMENTAL
AND CONTROL POPULATIONS AT
CONSECUTIVE INJECTIONS

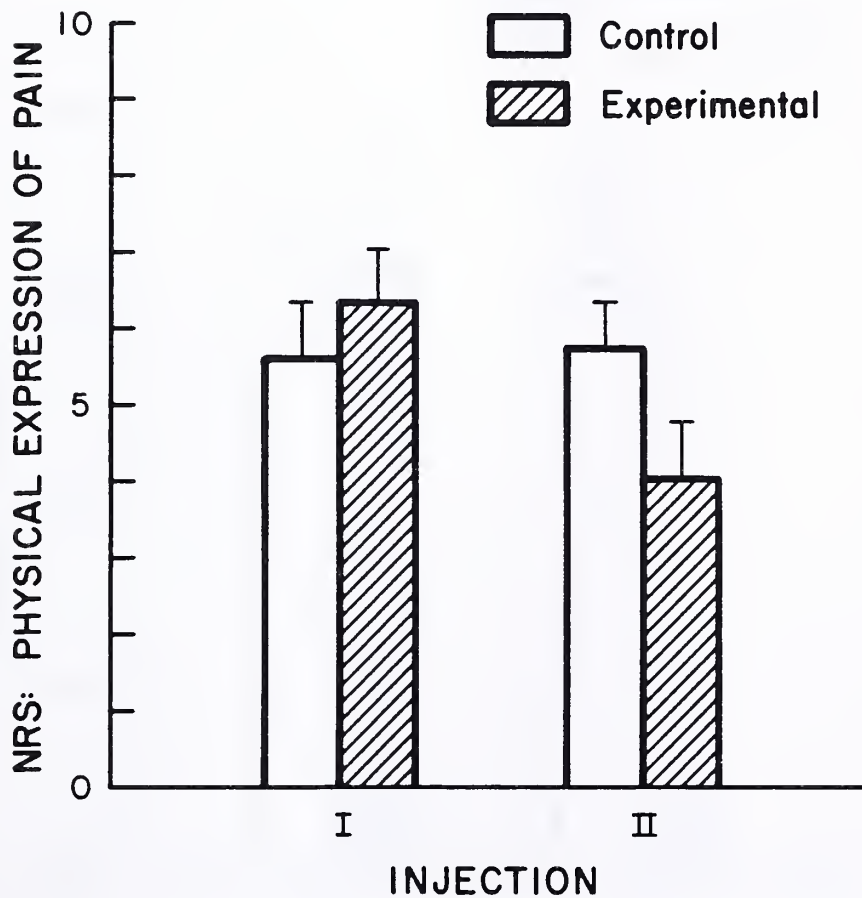


Figure 8

MEAN VALUES AND STANDARD ERRORS
OF HEART RATE FOR EXPERIMENTAL
AND CONTROL POPULATIONS AT
CONSECUTIVE INJECTIONS

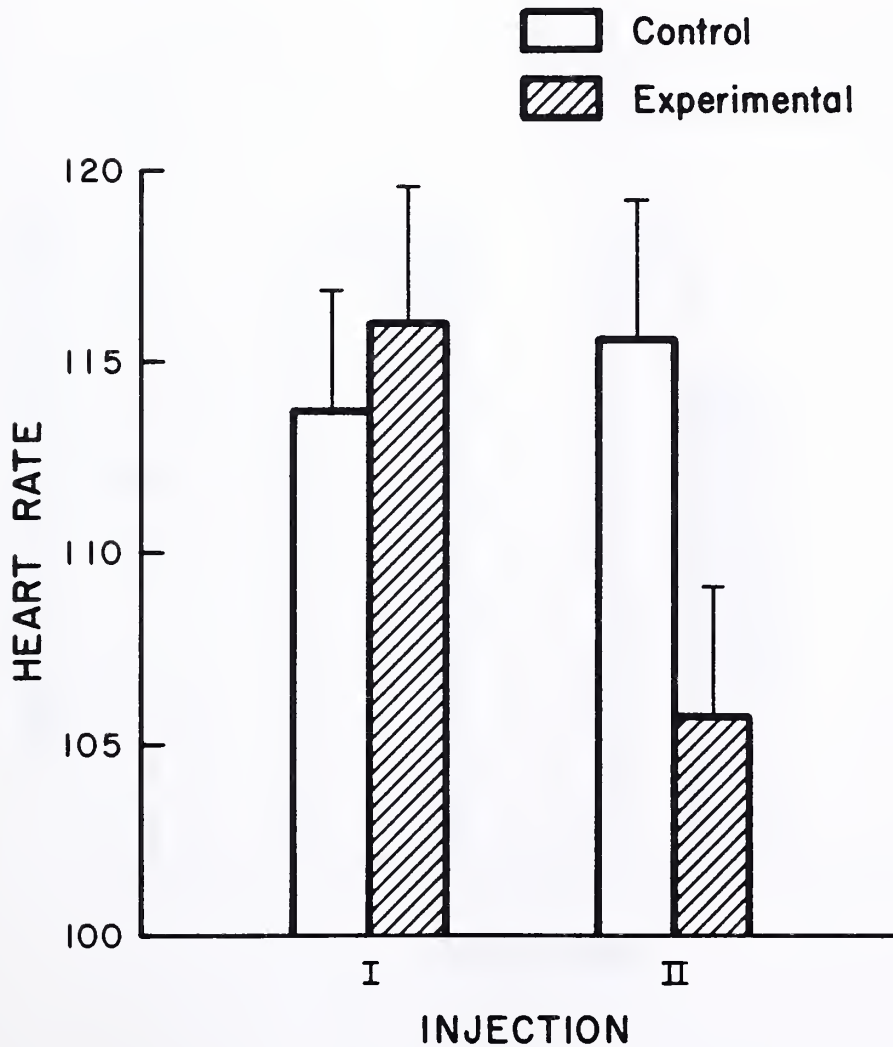
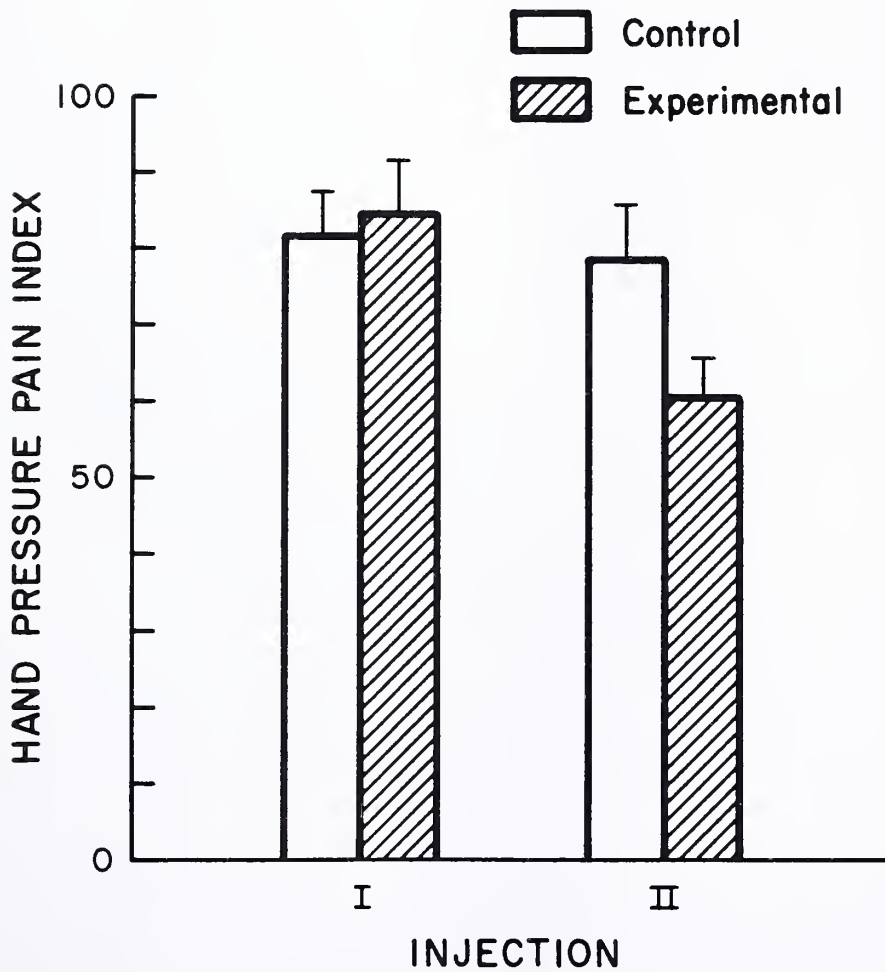


Figure 9

MEAN VALUES AND STANDARD ERRORS
OF HAND PRESSURE PAIN INDEX FOR
EXPERIMENTAL AND CONTROL
POPULATIONS AT CONSECUTIVE INJECTIONS



changes in Pulse Rate or HPPI scores between Injection I and Injection II.

This study also generated extensive clinical data in the form of children's drawings and stories pertaining to needles. These findings are presented and discussed under Clinical Evaluation.

CHAPTER IV

DISCUSSION

Analysis of Results

These data support the hypothesis that the experimental intervention as a whole can be effective in reducing the fear of needles in children. This finding is consistent with clinical observations of Webb (1966), Brandt et al. (1972) and Lewis (1978), and the empirical investigation with children reported by Fernald and Corry (1981).

The results of the Nurse Rating Scale indicate that the intervention rendered the children less fearful and more cooperative in all parameters explored except Verbal Expression of Pain. In other words, although the children were more likely to hold still, they screamed just as much.

The finding of no decrease in Verbal Expression of Pain would appear to contradict the report by Shapiro (1975) of 12-year-old kibbutz girls calmly receiving injections without the apparent need to cry out. This difference may be due to the older age of the population studied by Shapiro. It is possible that the social reinforcement of cooperation and "being grown-up" is strong enough to overcome the need to cry out in older children, while younger children react on a more instinctual level. As noted, the unique attributes of

the kibbutz environment may well affect the behavior patterns children develop in response to stressful situations. Unfortunately, the author does not present sufficient data to determine the relationship between fear level and vocalizations in the individual children studied.

In the present study, the Verbal Expression of Pain may indicate that the child knows s/he is in a safe, secure environment and will not be punished for expressing emotion. The intervention did not directly attempt to discourage crying. In fact, the emotional component of the experience was discussed and the unpleasantness of the situation was acknowledged. Although cognitively understanding the need for the procedure, the child may still perceive the needle as an invasion, and the cry may represent a need to rebel and protest. Lastly, in the story utilized during the intervention, children are depicted crying out and exhibiting emotion. As children seem to relate to storybook characters as real people, such a presentation may well encourage similar behavior through modeling.

The results of this study suggest that a Nurse Rating Scale can be a useful measure of child behavior and attitude. As children are used to nurses, their presence is less disruptive than anonymous observers.

The observed decrease in pulse rate further suggests that the intervention successfully reduced fear and anxiety prior to the injection. This observation is consistent with the findings of Shapiro (1975), supporting the contention that such simple physiological measures can be predictive in applied

contexts with children.

The reduction in perceived pain as assessed by the HPPI is consistent with the reports by Hill et al. (1952), Shor (1962), and Egbert et al. (1963,1964). It is also consistent with the hypotheses advanced by Melzack (1961) and Fuller (1980) concerning the contributions of anxiety to pain perception in adults.

Although such an effect has been postulated to exist with children (McCaffery, 1971), no experimental investigation on this topic has appeared in the literature.

Taken with the dramatic findings reported by Egbert et al. (1963,1964) demonstrating reduced post-operative narcotic requirements and decreased length of hospital stay following cognitively based intervention, the present results would seem to present a compelling argument for providing information in a supportive context to hospitalized patients of all ages. Such brief intervention appears capable of reducing pain and dependence on narcotics, speeding recovery, shortening hospital stay, and reducing health care cost to the individual and society.

As discussed, pain is a difficult experience to describe, quantify and research. The problem is particularly acute in work with children who may be less able to cooperate or provide verbal description. Ethical considerations properly severely restrict the experimental exposure of children to painful stimuli. Yet, we desire to make life experiences less painful for children and we attempt to construct research studies

despite these methodological constraints.

The results of this study suggest that the HPPI may be a valuable tool for research on perceived pain in children. As a noninvasive, child-generated measurement, it avoids the potential exacerbation of anxiety present with physiological measures and the subjectivity inherent in rating scales.

Limitations of time and resources precluded long-term follow-up of these children. Further work on behavior during subsequent injections both during and after hospitalization is clearly indicated. It would also be most interesting to explore the effects of the reductions in perceived pain on medication requirements and hospital course.

As each child in the Experimental Group received the entire intervention, it is not possible to ascertain the relative contributions of various aspects of the program to the observed behavioral and physiological changes. Based upon this study, it can only be concluded that the intervention as a whole is associated with the findings reported.

It seems, however, that most any ethically designed intervention program would incorporate aspects of several modalities. Providing information through books, films or pre-hospitalization visits will (hopefully) correct misconceptions. Hospital play incorporates desensitization and offers an opportunity for the expression of fears and the development of mastery.

It is the belief of this author, supported in part by previous investigation (Fassler, 1980a), that the interaction

of multiple techniques contributes to the beneficial effects derived from hospital intervention programs. Despite methodological difficulties, further work on this area appears warranted.

It is important to acknowledge that the intervention explored in the present study was not equally successful with all children. Some may have been so traumatized by previous experiences that brief intervention was not sufficient to gain their trust and reduce their anxieties. Other children appear to have parents with extreme fear of needles who exacerbate the child's aversive response.

These observations highlight the importance of dealing with each child individually and attempting to assess the nature and origins of his or her fears. They also suggest that further work is needed aimed at exploring the relative effectiveness of cognitively based intervention for children with fears of differing etiologies. It may be possible to identify sub-populations who respond well to brief intervention and those who require more extended attention. Such information would lead to more efficient utilization of existing limited resources and improved accuracy in the design of future research methodologies.

Clinical Evaluation¹

As expected, the children included in this study exhibited

¹Some of the drawings and stories included in this section were collected during preliminary work with children on the pediatric wards of Yale-New Haven Hospital, New Haven, Connecticut.

a wide variety of fears and misconceptions associated with needles. The experimental intervention techniques proved extremely useful for encouraging the expression of these ideas. The discussions following the story reading, drawing and hospital play activities offered an opportunity to explore the children's beliefs in greater depth. As part of the experimental intervention, each child received reassurance and accurate information to counteract the often bizarre fantasies s/he had constructed. Considering the nature of the children's beliefs, it seems probable that correcting their misconceptions contributed to the overall reduction in fear and anxiety effected by the experimental intervention.

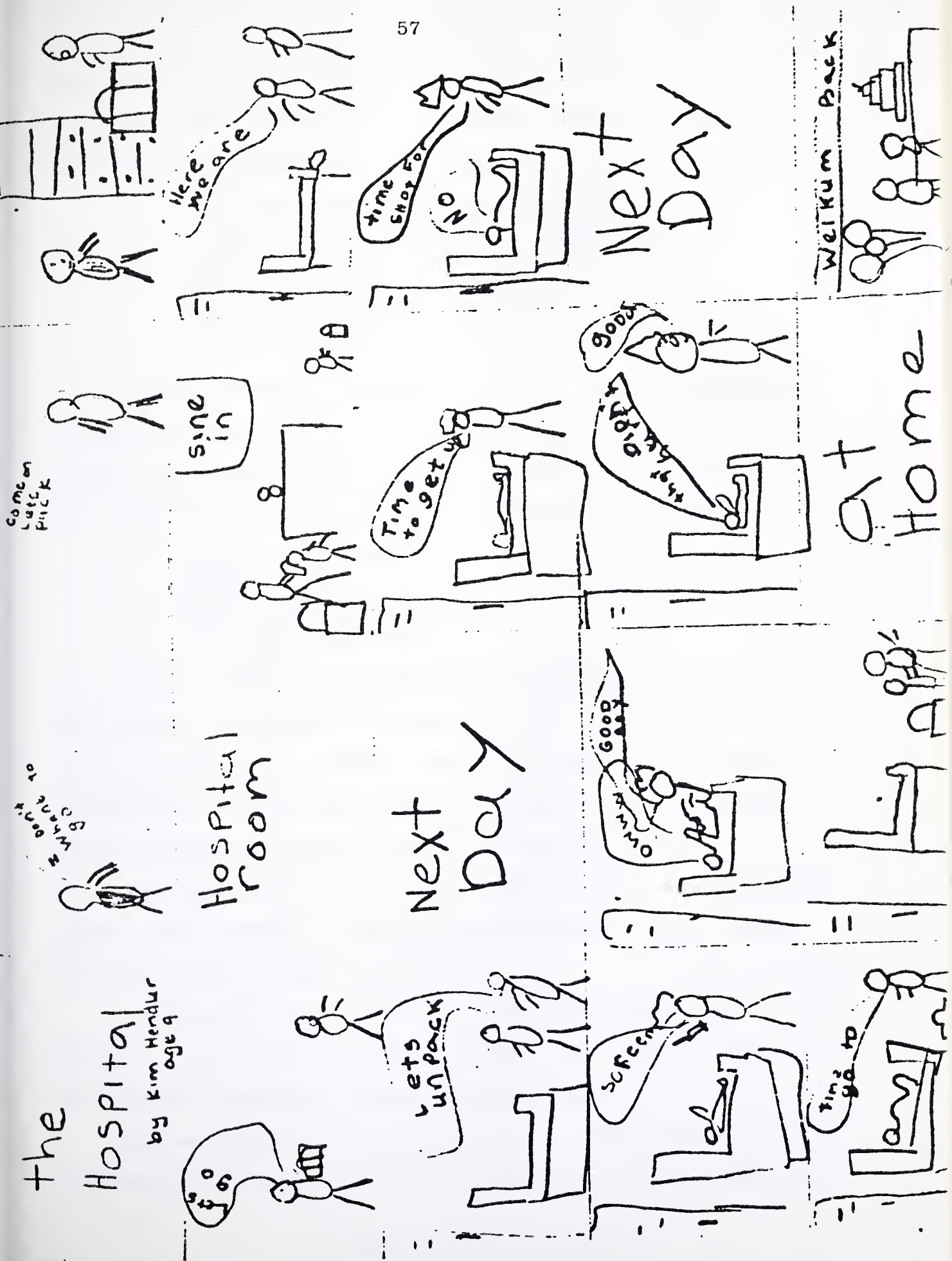
The extent to which hospitalized children focus on encounters with needles is evidenced by the frequency with which they incorporate them into projective drawings and stories. An 8-year-old boy offered the following summary of his two-week hospital stay:

The hospital has lots of needles. And they take your temperature three times. There's lots of doctors taking care of you. On Wednesdays and Thursdays, and also Fridays, the doctors operate. Then you wake up mad, a little grouchy. You have to stay in the recovery room for two days. Then you go back to your room and they take the needle out. And then lunch comes. The next day you go home. The end. by Matt.

A 9-year-old boy whose extensive heart surgery necessitated prolonged hospitalization drew a cartoon recounting his hospital stay (Illustration 1). The sequence included his home, admission at the hospital, five frames of receiving an injection, and then going home again. Similarly, an 8-year-old

the Hospital

by Kim Hendler
age 9



boy hospitalized for orthopedic procedures involving traction and a body cast expressed the following thoughts shortly before being discharged from the hospital:

What isn't fun about being here is getting all these SHOTS. No shots! I don't like shots. OUCH! OUCH! OUCH! Right in the tush. The worst thing about the hospital is the needles. I'm glad I'm going home! I get sick and tired of the hospital and needles, needles, NEEDLES.

Although needles depicted by children vary considerably in shape and design, the universally emphasized characteristic is the sharp point (Illustrations 2 a and b). A 5-year-old boy summarized his feelings with the following explanation:

I don't like needles.
They're metal.
They're sharp.
And they keep sticking you.
'til they get it in!

In the numerous drawings which incorporate needles, the size is often exaggerated attesting to the significance with which children view needles. In fact, children often depict themselves as smaller than needles, emphasizing the sense of being overwhelmed and attacked (Illustrations 3 a-d).

When drawn in relation to injection sites, needles often appear quite ominous and easily large enough to pass through an entire arm (Illustrations 4 a and b).

Doctors and nurses are often depicted as mean and sadistic in drawings involving needles. They smile, while the children are clearly upset (Illustration 5).

In one drawing (Illustration 6) the child appears to be crying while the medical person is faceless. A child may see



Illustration 2a

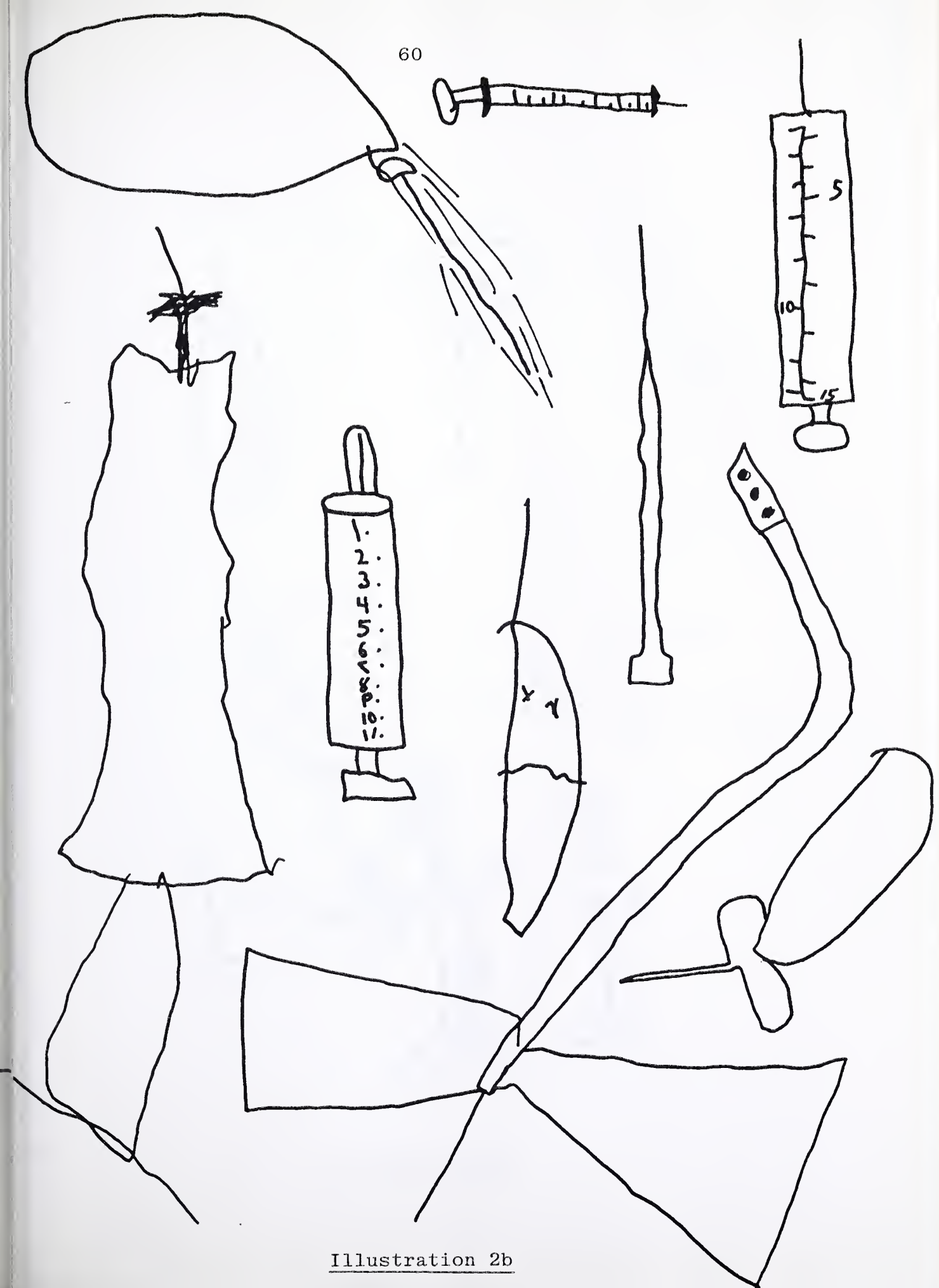


Illustration 2b

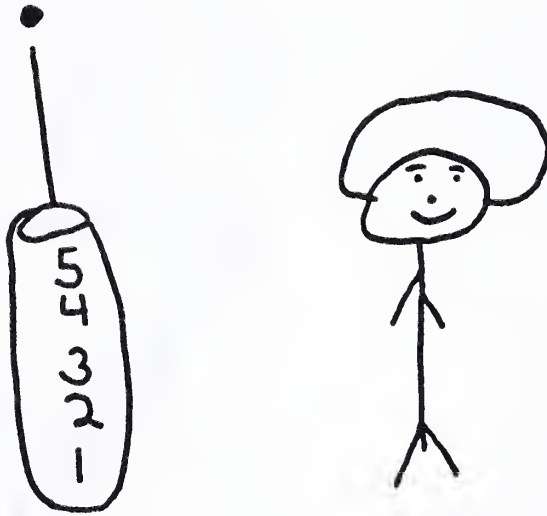


Illustration 3a

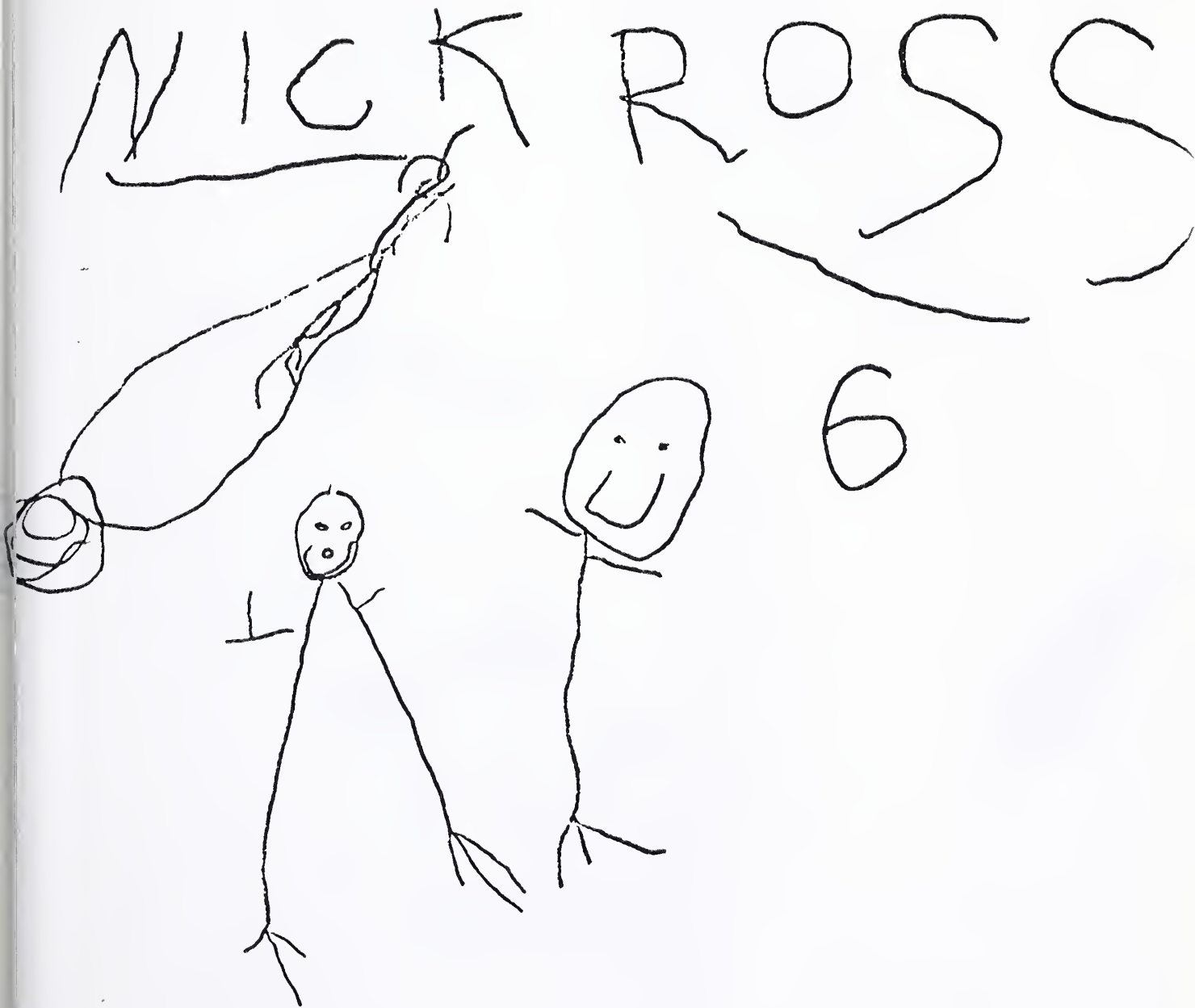


Illustration 3b

Nathan

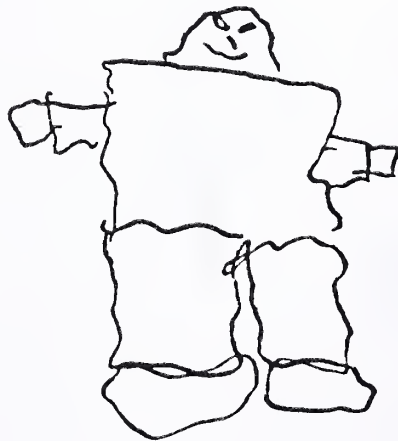


Illustration 3c



Illustration 3d

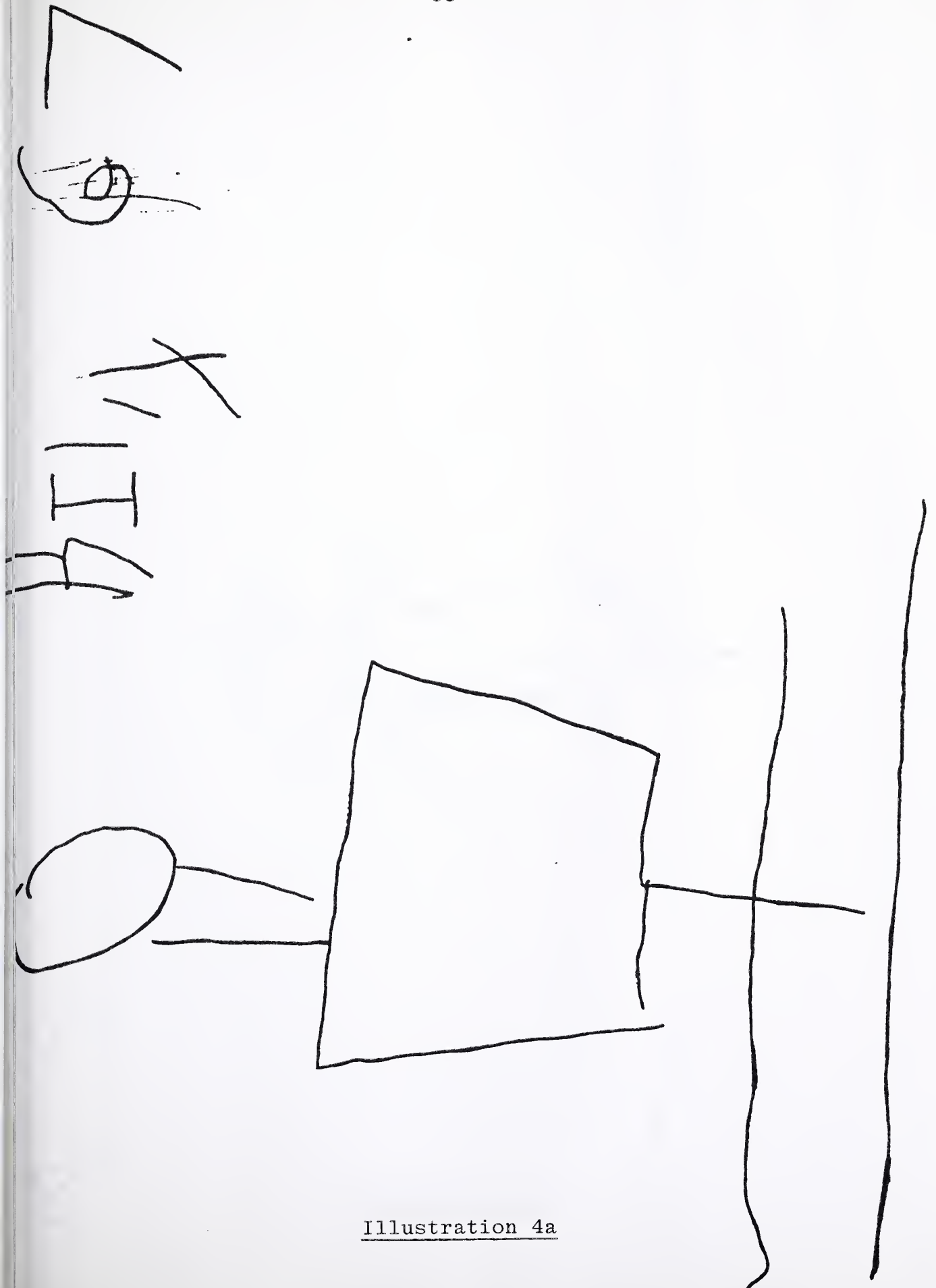


Illustration 4a

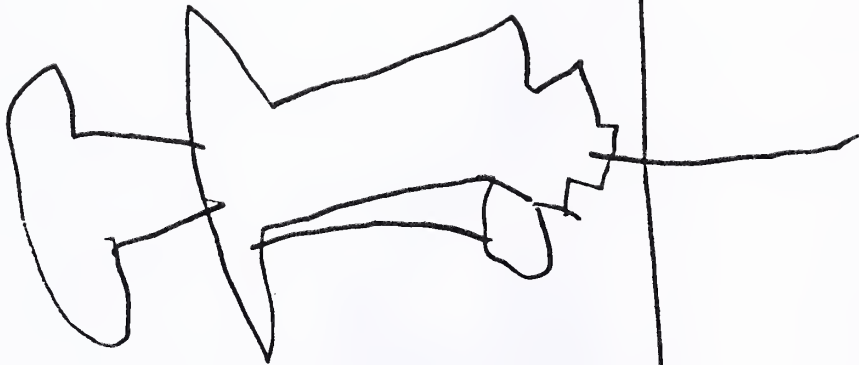


Illustration 4b

100X
C

By andre CJ

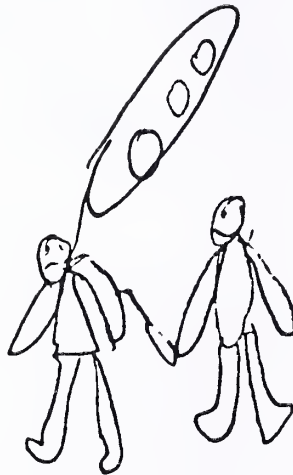


Illustration 5

Age 9!
I only Paul

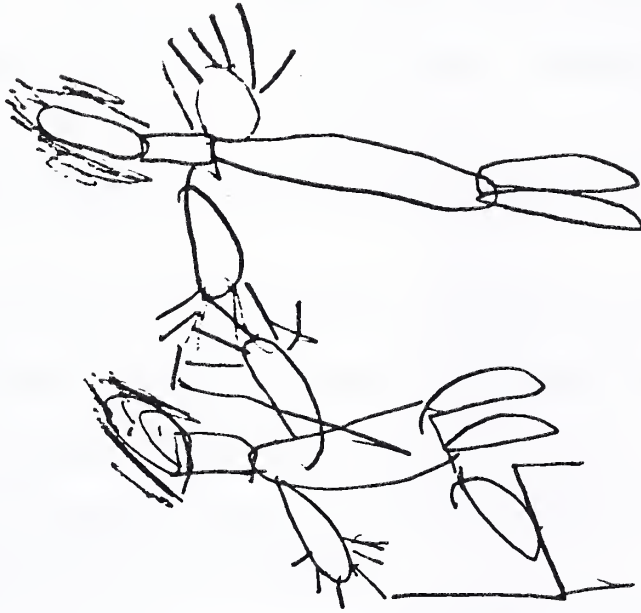


Illustration 6

so many different laboratory technicians during a hospital stay that indeed they may become faceless.

Not all children are able to draw themselves getting a shot. An 8-year-old boy drew himself smiling because he had put himself safely in a box protected from the oncoming needle (Illustration 7). One girl found the prospect of drawing herself receiving a shot too frightening. Instead, she drew herself giving Ernie a shot (Illustration 8). Although she is smiling, Ernie seems to have mixed feelings about the arrangement.

In their drawings and stories, children often focus on the pain associated with needles and the related medical procedures. Some children add vocal comments to their drawings expressing pain (Illustrations 9 a and b). An 8-year-old girl offered the following thoughts:

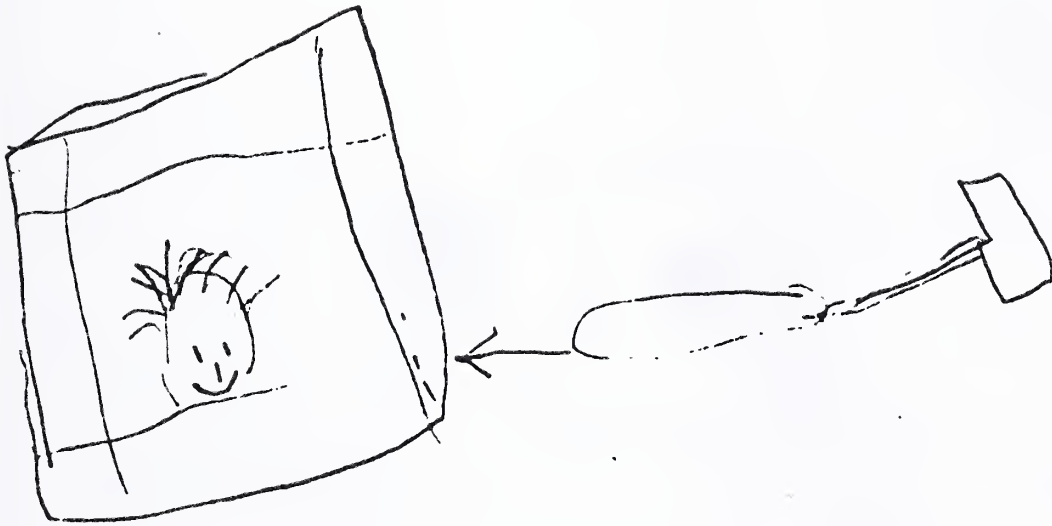
The scariest thing about the hospital is
needles.
They hurt!
He said it was gonna be a little pinch,
but the little pinch hurted!

A similar opinion was provided by a 6-year-old girl. She said:

Needles, they hurt.
Also, you can say they sting.
They scare you.
The alcohol makes it scarier.
And they just poke it right in you.
There's nothing good about needles!

Although pain may not explain the response of all children to needles, it may be a necessary reinforcer for fearful behavior.

During the course of this study, I observed the following



Fr: k 8

Illustration 7

U
K
7
0
L
Y
h



Illustration 8

Lindie Murray

10



Illustration 9a

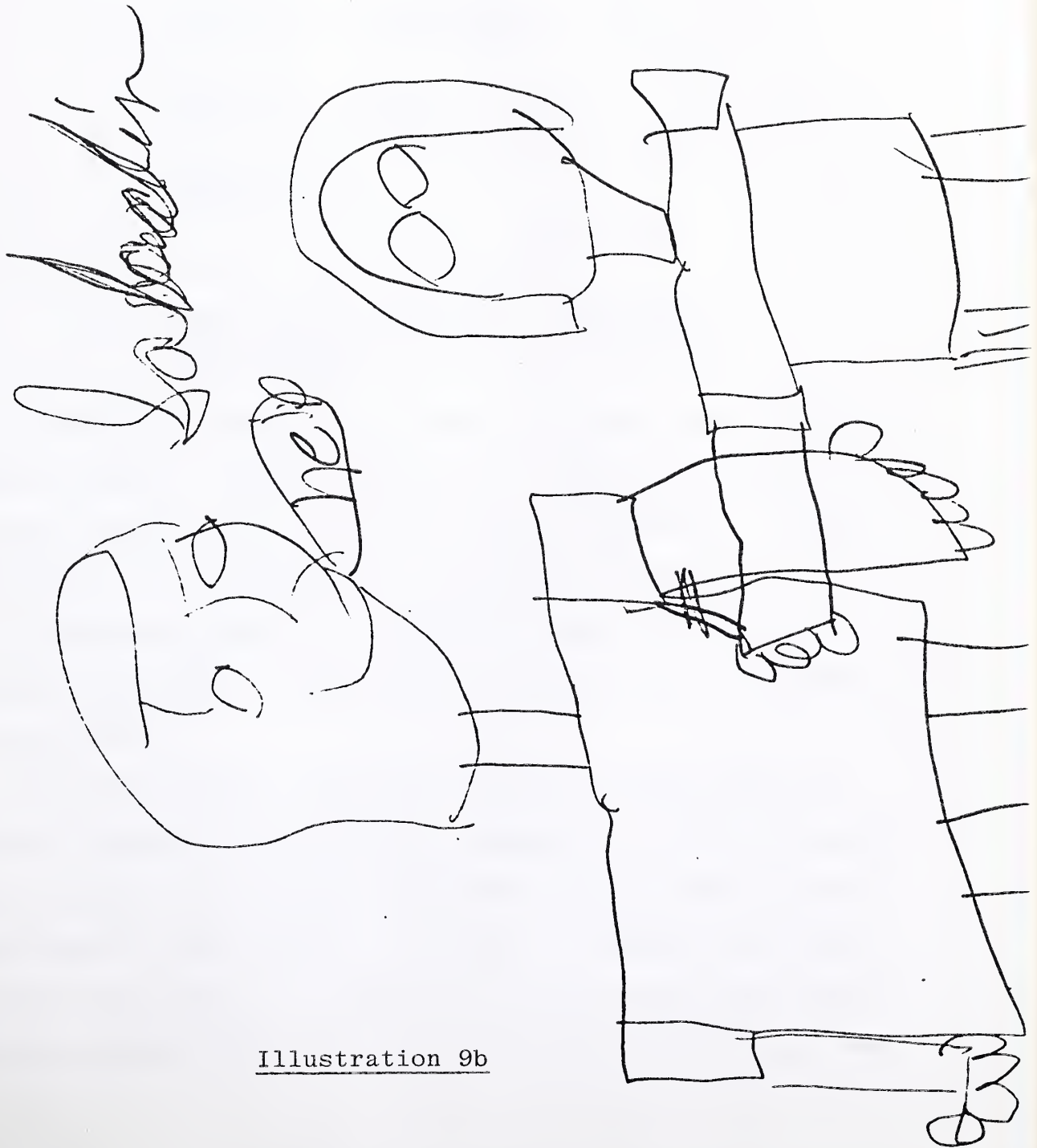


Illustration 9b

interaction between a medical student and a 6-year-old girl:

CC I have to draw some blood, Mary.

Pt Think you can do it better than the last time?

CC I'll do the best I can. I'm still pretty new at it.

Pt I know. I've been here longer than you have.

CC I'll put this big rubber band on your arm. Are you ready?

Pt I'm always ready. I'll count to 15 and see if you have it yet.

CC (with needle in pt's arm) You have a squiggly vein.

Pt ...14, 15 So do you. Time's up. I win. Want to try again?

CC (withdrawing needle) OK. One more time. Here goes. (reinserting needle in pt's arm)

I watched in amazement at this uncharacteristic display of stoic behavior. After the blood was finally obtained, I asked the student why the girl had been so compliant. He explained that she suffered from "congenital indifference to pain," a rare syndrome which results in total absence of peripheral sensation. "She lets all the new medical students practice on her."

In this instance, the child's fear of needles was not constantly reinforced with painful reminders, and her prolonged hospitalization and frequent blood tests caused her to become desensitized to these events. In fact, it appears that such encounters had positive connotations for this girl due to the increased attention and social reinforcement she received from

the medical personnel.

Fears related to needle penetration are the major source of concern and anxiety for some children. This is particularly evident in drawings where the needle is often depicted as actually piercing through the entire arm (Illustrations 10 a and b).

As many young children are uncertain about the integrity of their bodies, the invasion of a needle may represent frightening possibilities. Most young children have experienced the result of the interaction between a balloon and a needle or sharp object. In their minds, the body may not be all that different.

A child may feel that any violation of surface integrity creates a potential channel permitting either the loss of important inner matter or the entrance of dangerous external substances. The young child who relentlessly demands a Band-Aid for a small scratch may be motivated by such concerns. One 6-year-old girl expressed these ideas as follows:

Needles are scary because they're sharp and they go into you. Sometimes they make you bleed. If you bleed too much, you can die.

Another major area of difficulty involves children's misconceptions about the reasons behind the procedures which involve needles. For example, many children believe that the blood is tested "to see if it's good or bad." A 7-year-old girl explained, "They take your blood and look at it to see if it has things in it. Then if it's bad, you have to get more shots and tests until it gets better." A 7-year-old boy

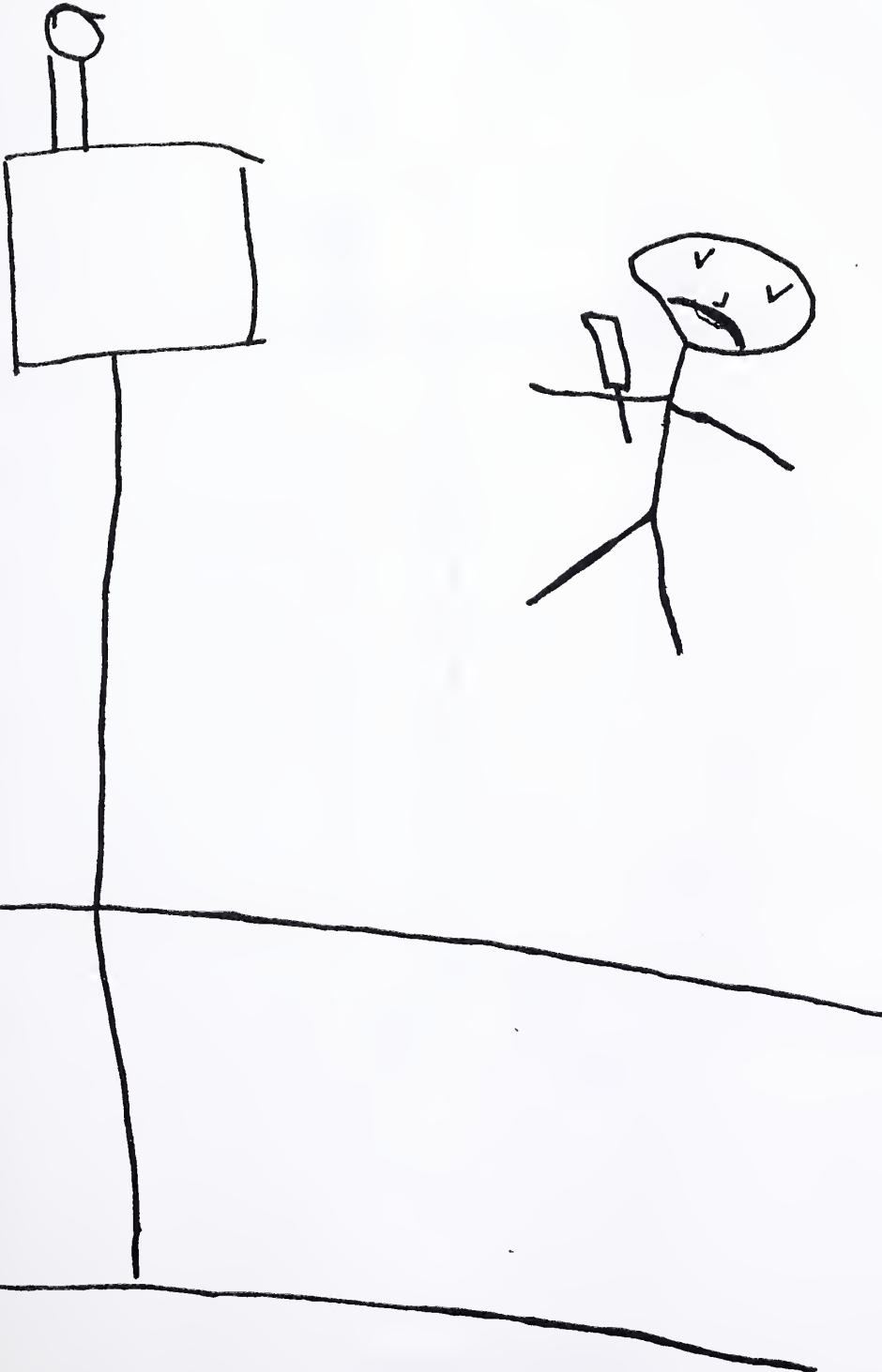


Illustration 10a



Illustration 10b

thought the blood was saved, mixed with medicines, and put into other people. A 6-year-old girl thought that the doctors can see what people are thinking by looking at their blood. Interestingly, a 6-year-old boy thought the procedure was called a blood taste. As a result, he envisioned doctors sitting in a small back room, tasting blood to see if it's all right.

Children have offered the following thoughts about injections:

The end of the needle stays inside
your body.
Doctors give shots to put you to sleep
and make you forget things.
It's a glue shot to make my bone stick
back together.
My mommy told them to give me a shot.
They said I'd get shots if I didn't drink
enough.

Such ideas perpetuate the perception of illness, hospitalization and medical treatment as punishment, thus increasing the child's guilt over the situation and the anxiety experienced in association with the procedure.

One 4-year-old boy viewed his whole hospitalization for a broken arm as a punishment. He told the following story:

I came to the hospital 'cause they wanted
me to have needles. They wanted me to have
a fever. They gave me a cast 'cause they
wanted me to be careful.

The degree to which children focus on needles and associated medical procedures is further evidenced by the frequency with which they are incorporated into written fantasy. Doctors and nurses are often represented as sinister characters, as in the following poem by a 9-year-old boy whose prolonged

hospitalization necessitated frequent blood tests:

I like to make faces.
 A vampire face.
 It's Count Dracula coming to suck your
 blood.
 He wears black clothes.
 He's coming to suck your blood.
 He moves slowly, slowly.

Identification with the aggressor appears to be a mechanism employed by many children to cope with experiences involving needles. Such expressions usually take the form of drawings or stories about doctors, nurses, parents or Child Life workers receiving needles. Often during play activities young children take particular delight in administering multiple needles to adults. A 9-year-old girl explained her feelings as follows:

I feel like I've had 5,088 plus 91
 plus 61 NEEDLES! When you give them
 to somebody else it feels good. It
 doesn't feel good to get them! I don't
 like hurting people. I feel like being
 the nurse's nurse, then they'll know
 what it's like to be all sick and yucky
 and in traction.

Sometimes children can best express their fears about needles through projective fantasy drawings. Illustration 11 is a picture of a monster by a 7-year-old boy. He told the following story: "The hunters caught him in the woods. They shot him full of holes with big needles." Here, the doctors are the hunters, the hospital is the woods, and the child himself is the monster-victim.

The fear of needles may often represent a fear of being overpowered or attacked. Large, powerful and ominous forces and cries for help are evident in many drawings (Illustration 12).

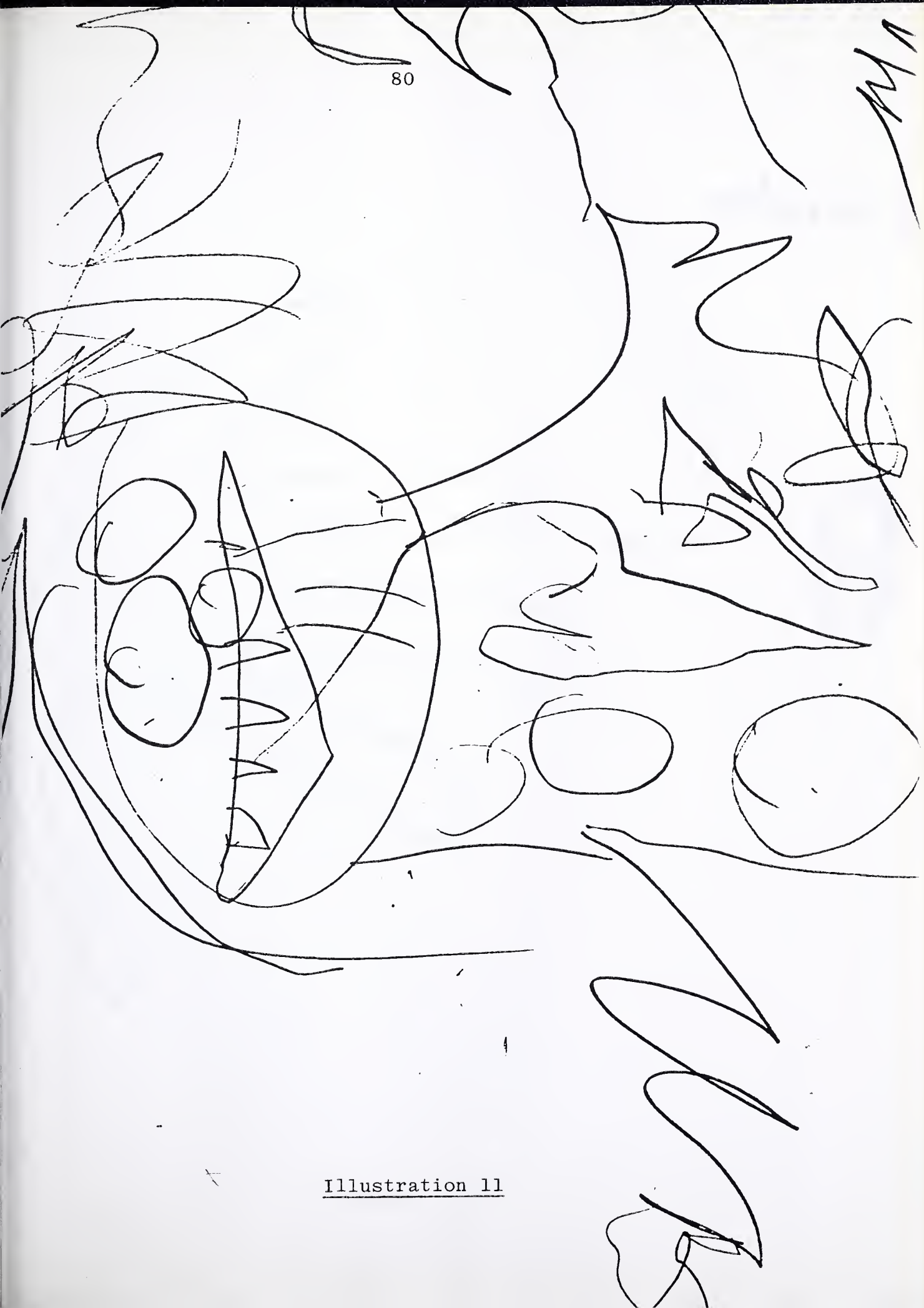
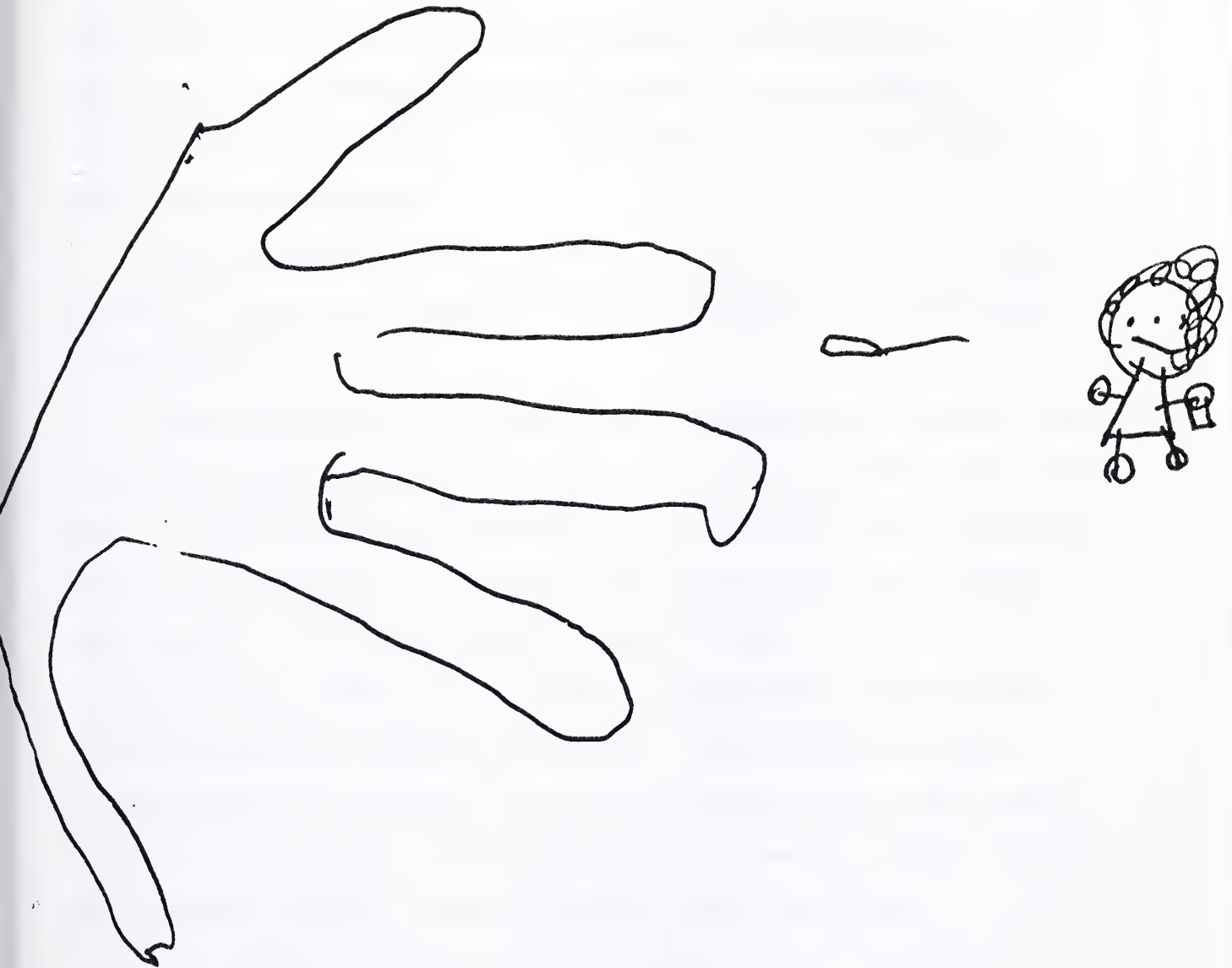


Illustration 11

Roberto 5

Illustration 12

One of the few groups of children who do not appear afraid of needles are diabetics. In their drawings, the needles are usually smaller and more realistic. They are also some of the only children who draw themselves as smiling while receiving shots. One difference is that most diabetics, even young children, understand why they are getting the shots. They are also somewhat desensitized due to the frequency of their injections. These factors combine to make the experience less threatening.

Interestingly, children who have had the disease longer appear to depict the needles as smaller and less threatening (Illustrations 13 a-d).

Many children have shared their thoughts and suggestions on methods of coping with needles. Several provided ideas for ways to avoid needles altogether. A 4-year-old girl expressed her wish as follows: "I would steal the needles for taking your blood.... and the doctors wouldn't know I took it." A 7-year-old boy shared the following suggestions for modifications in anaesthesiology procedures: "The hospital needs... a room that smells good to put you to sleep so you won't have to hurt, so you won't need needles." A 9-year-old girl offered this advice to other children faced with injections:

When you get a needle, it hurts!
 You need your mommy.
 My advice-- scream as loud as you can,
 or look the other way and say,
 "I must have a fly on me. I
 better wipe it off" or say,
 "It's nice at the Holiday Inn."

In addition to enhancing the understanding of children's



Robert
Clougherty
10

Illustration 13a

10-year-old diabetic diagnosed 1 month
prior to drawing

Figure 1, page 13b

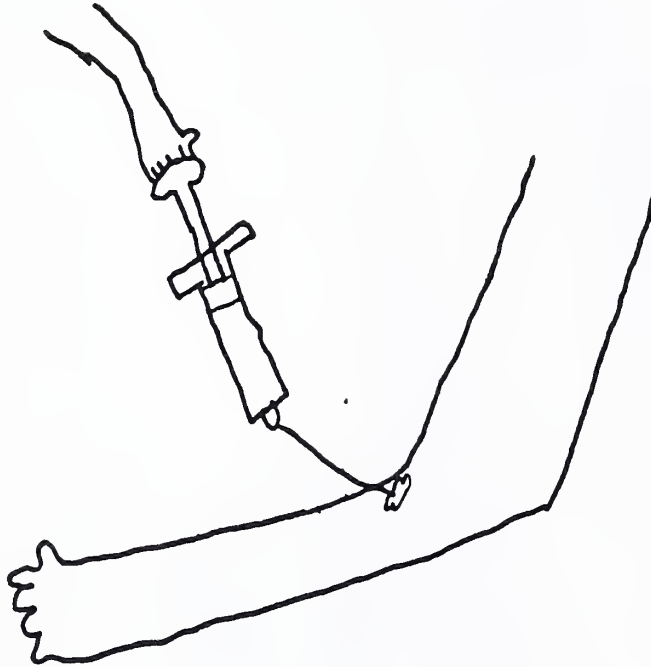


Illustration 13b

10-year-old diabetic diagnosed 1 year
prior to drawing



Linda g

Illustration 13c

9-year-old diabetic diagnosed 3 years
prior to drawing



Stirley
Hohman

Illustration 13d

13-year-old diabetic diagnosed 6 years
prior to drawing

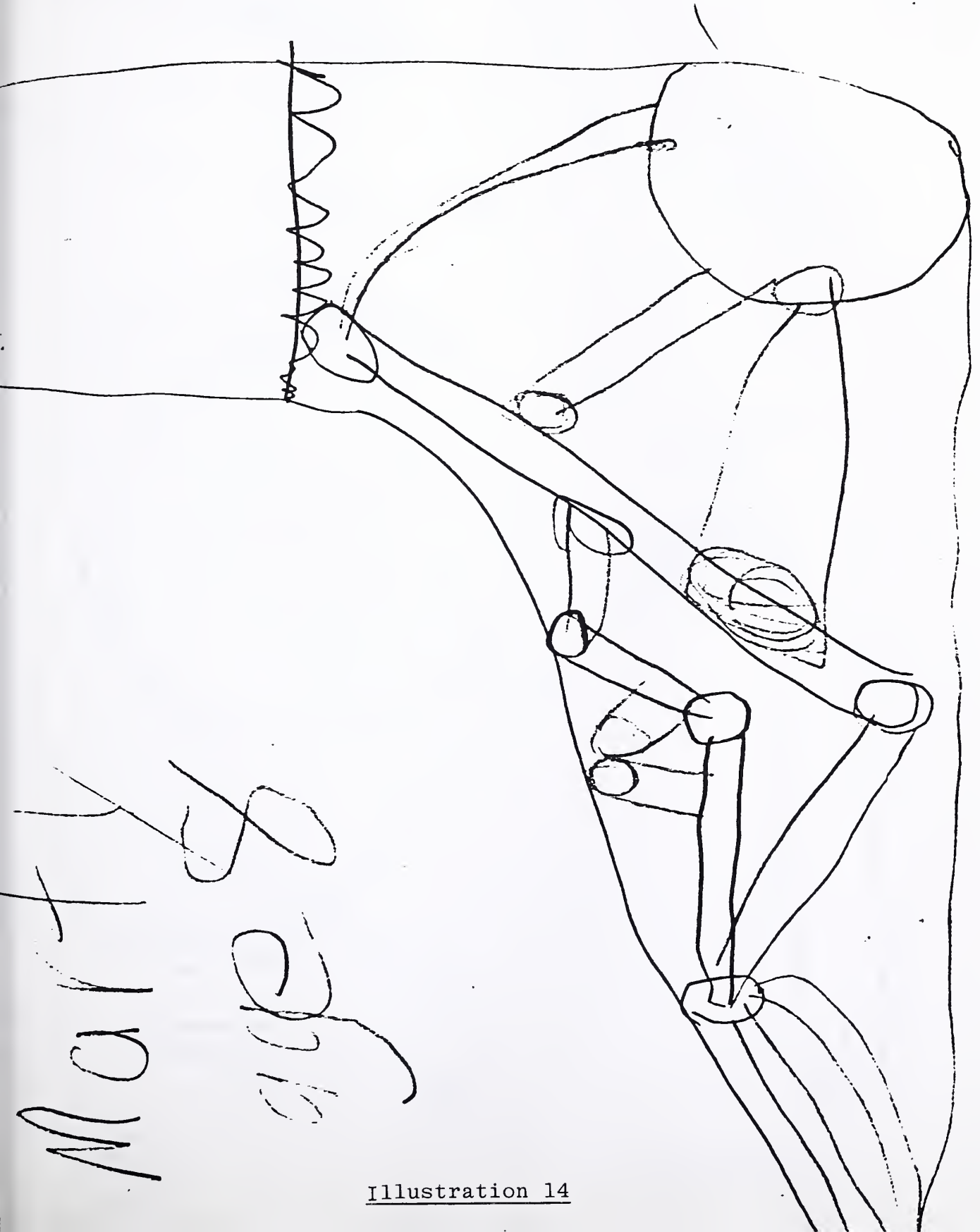
thoughts and feelings, drawings can be useful to monitor change in children's attitudes. Marty is an 8-year-old boy who underwent surgery related to Charcot-Marie-Tooth syndrome. Illustration 14 depicts the surgery on his foot. He said, "They went in and broke all the bones and screwed them together differently." After the operation, the boy was in considerable pain, but attempts to administer injections of pain killers met with formidable resistance. In fact, he had to be held down by three people. He explained that the needle was so frightening, he would rather endure the pain.

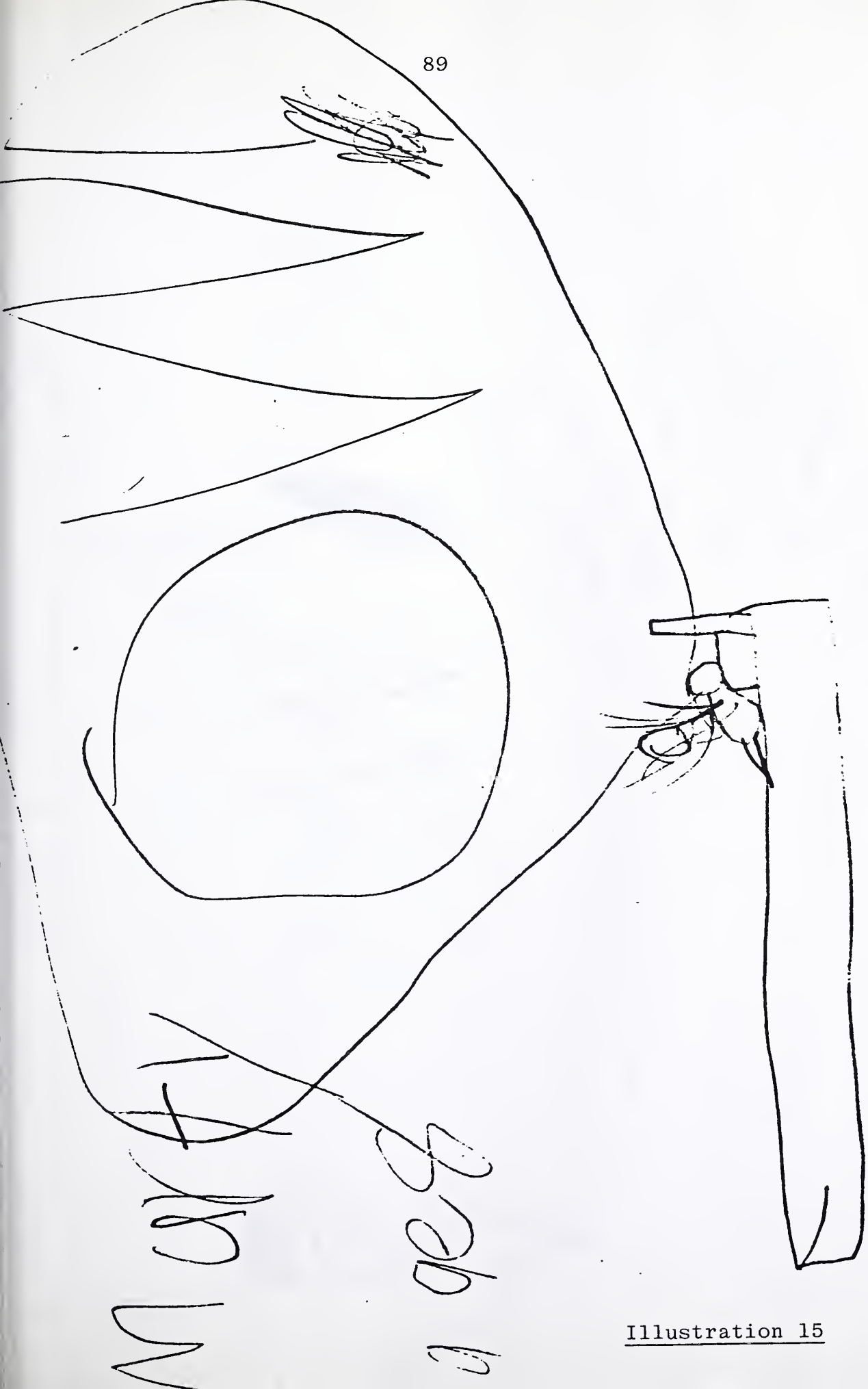
The level of his anxiety is quite clear in his drawings. His picture of "a person getting a shot" is clearly dominated by verbal expressions of pain (Illustration 15).

In his depiction of himself receiving a shot, the "OW" is again prominent, and blood can also be seen spurting out from the site of the injection (Illustration 16).

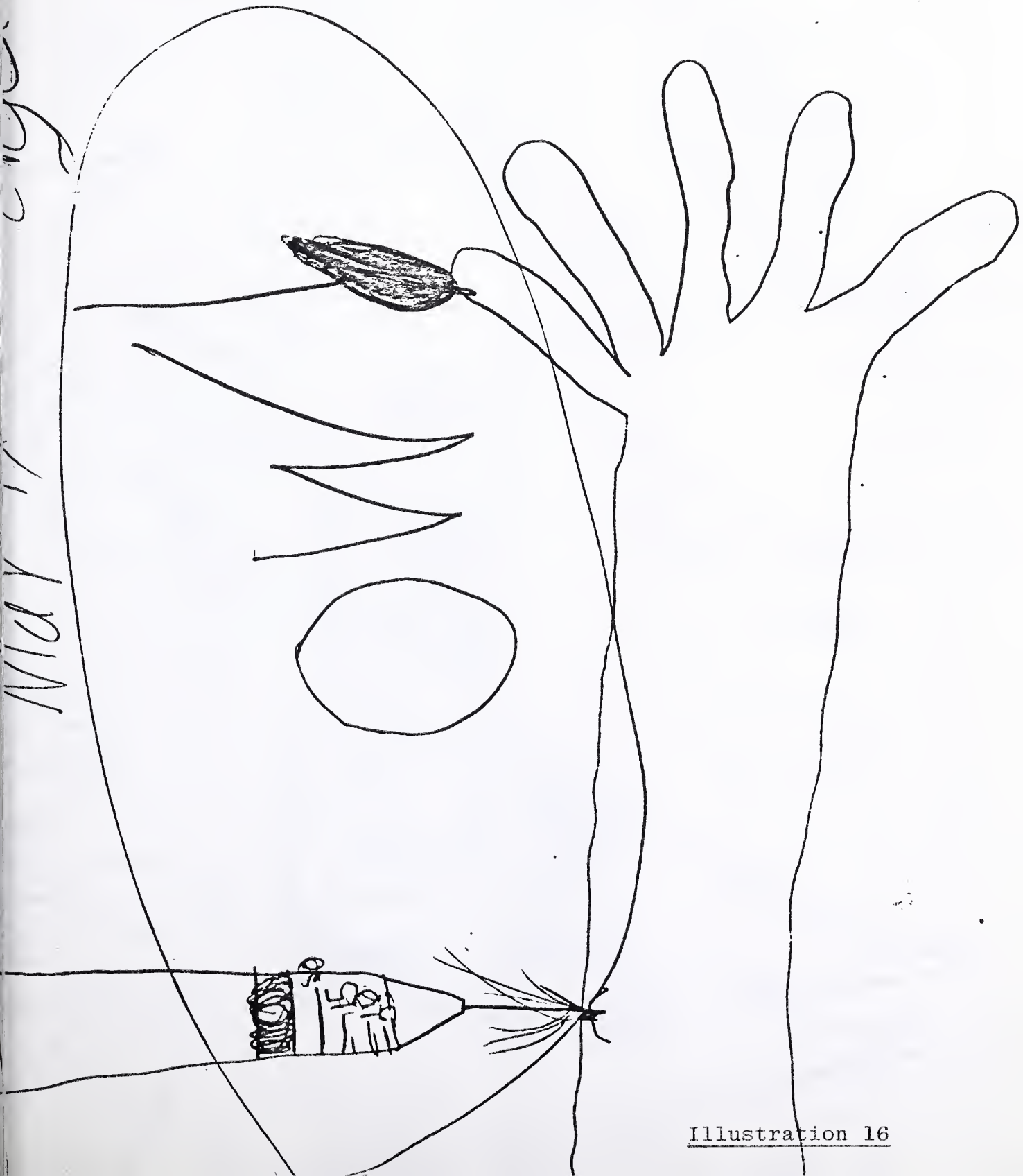
At one point in the intervention, I asked Marty where he thought needles came from. Without hesitation he produced a picture of The Needle Factory (Illustration 17).

At the end of the intervention (discussions, explanations, drawings, stories, needle, doll and puppet play), his drawings appeared somewhat less ominous (Illustration 18). The "OW" is reduced to an "UGH" and the spurting blood is gone. After the conclusion of the intervention, Marty spontaneously produced an additional drawing (Illustration 19). In this picture, the whole room appears and the event seems to be placed in more appropriate perspective.

Illustration 14



Mr. F. V.
Bob

Illustration 16

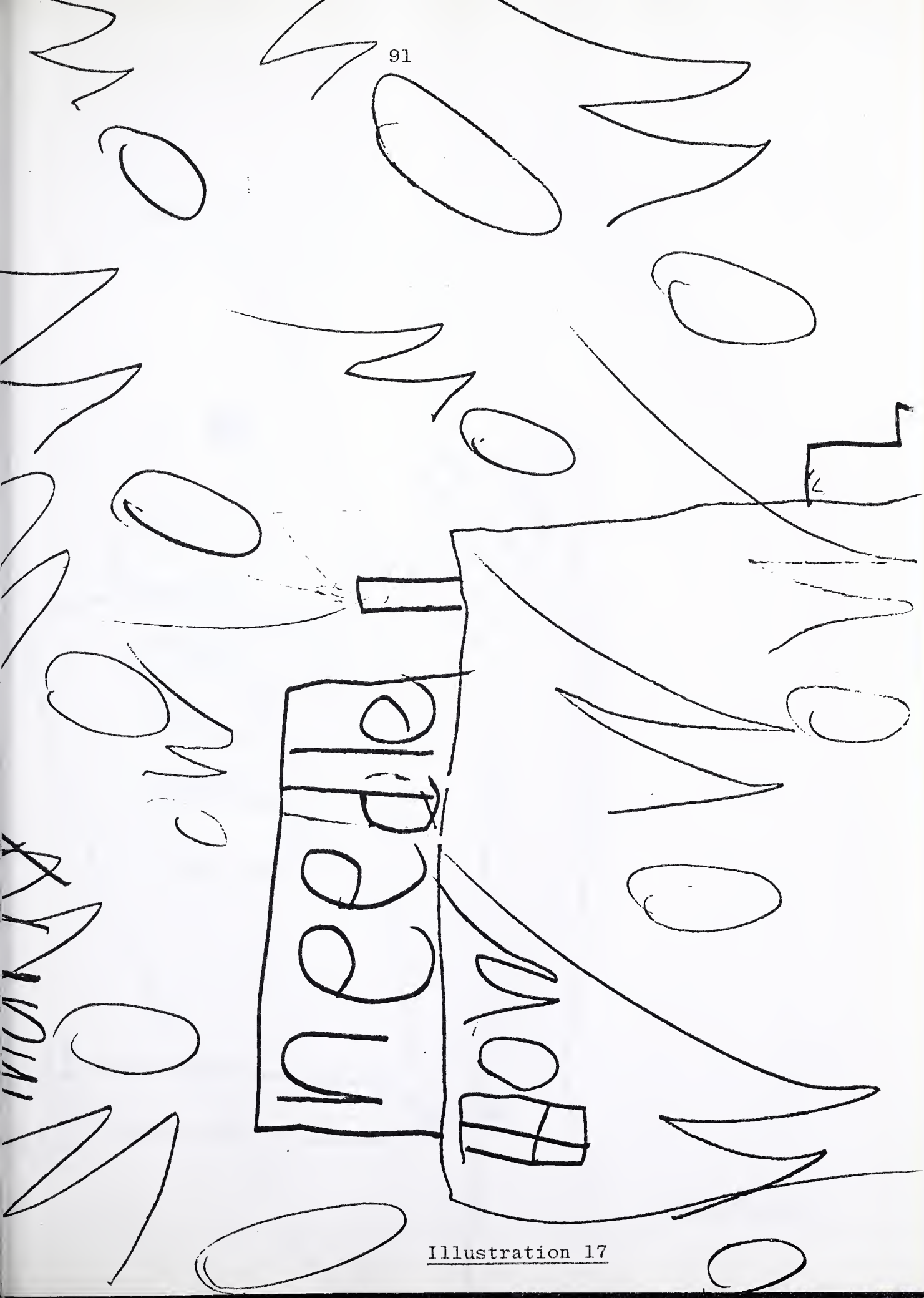
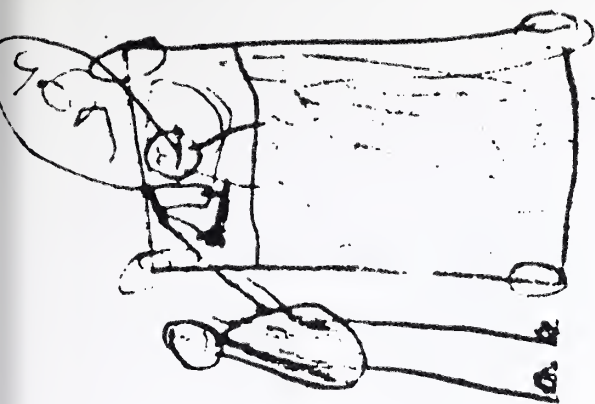
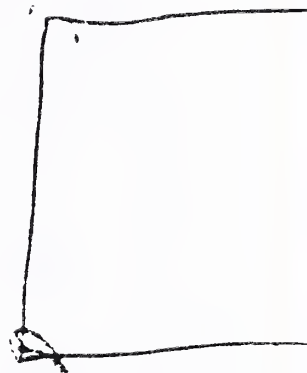
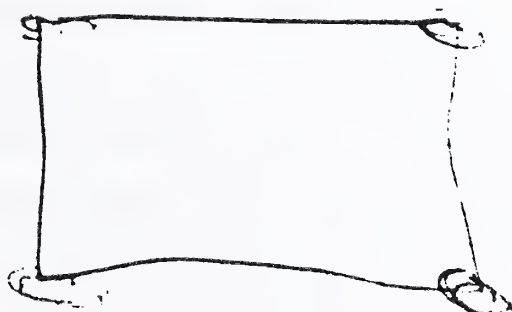
Illustration 17



Illustration 18



93



Marty

Illustration 19

When he was next to receive an injection, he told the doctor, "I don't want this shot, and I wish I didn't have to get it. I don't like them. But if I really need it, do it in this arm." Then he put the alcohol on by himself, and watched as he received the shot without requiring any physical restraint. Subsequent injections were tolerated similarly.

Implications

The results of this study suggest the implementation of changes in the treatment of children during injections and blood-drawing procedures. A relatively brief intervention has been shown to be capable of reducing fear and anxiety, and improving behavior and cooperation during a widely feared and frequently encountered medical procedure. Additionally, it has been shown that such cognitively based intervention can reduce the pain the child experiences.

There are many ways in which doctors, nurses and other health care professionals can help make encounters with needles less traumatic for young children. The basic components of the intervention described in this study can be employed in a hospital setting, clinic or private physician's office. It is important to explain to children what is happening and why. Such explanations should be repeated, and the child's understanding of the information should be explored. Many children hold serious misconceptions that can exacerbate the anxiety they experience in association with medical procedures. Children should never be made to feel that the painful procedure is a punishment for some real or imagined wrong. For example,

it is inappropriate to tell a child that an injection is necessary since s/he refused to take medication orally.

It is essential that children be encouraged to express their feelings and fears before, during and after any hospital procedures, and not be made to feel they must prove how "brave" or "grown-up" they are by withholding their emotions. Equating passive, nondisruptive behavior with being "good" implies that the child who cries or displays apprehension is, in some way, "bad." Children should feel secure enough with adults around them to cry without fear of being punished.

It is also crucial for doctors, nurses and parents to be honest with children. If a procedure is going to hurt, telling the child in advance strengthens the child's trust. Lies and empty reassurances can undermine the development of such trust, and seriously damage the basic relationship between the adult and the child.

As has been demonstrated, many children view needles as an attack. Medical personnel can help alleviate this perception by giving children some element of control over the situation. Children can be allowed to choose the arm to be used or to decide whether to sit or lie down. They can also be encouraged to participate actively by rubbing the area with alcohol, and by holding cotton swabs or Band-Aids.

Lastly, it may be useful to have a familiar supportive figure (usually a parent) present during potentially distressing procedures. Measures such as these may seem time-consuming or inconvenient in view of the rapid pace of hospital care and

medical treatment. However, careful preparation and thoughtful treatment of children will greatly reduce the anxiety experienced and help protect against the development of serious emotional difficulties later in life.

CHAPTER V

SUMMARY

The focus of the present study was the fear of needles in children. The purpose was to explore the overall effectiveness of a planned intervention program on behavior, heart rate and perceived pain during injections.

The intervention consisted of reading the child a book depicting an injection, encouraging play activities with hospital toys, and having the child draw pictures of needles and injections. Information was provided and misconceptions were corrected in a supportive environment. A Control Group receiving no planned intervention was also evaluated.

During a routine injection, behavior was assessed utilizing a seven item, 10-point nurse rating scale. Heart rate and an index of perceived pain based upon hand pressure determinations were also obtained for each child. The Experimental Group then received the intervention. Assessments were repeated for all children during a subsequent injection. The following hypotheses were formulated:

1. Children exposed to the intervention (Experimental Group) will exhibit significant reductions in fear, anxiety, verbal protest, physical protest, verbal expression of pain

and physical expression of pain as measured by the Nurse Rating Scale during an injection.

2. The Experimental Group will exhibit a significant increase in cooperation as measured by the Nurse Rating Scale during an injection.

3. The Experimental Group will show a significant decrease in pulse rates immediately before an injection.

4. The Experimental Group will demonstrate a significant reduction in perceived pain as measured by the Hand Pressure Pain Index.

5. Children receiving no planned intervention (Control Group) will show no significant changes in Nurse Rating Scale assessments, heart rate, or perceived pain as measured by the Hand Pressure Pain Index.

The subjects were 30 children ranging in age from 6 to 9 years. All were admitted to the orthopedic ward of the hospital. Composition of the treatment groups was controlled for age and sex.

The results of statistical analyses indicated that children who received the intervention (Experimental Group) displayed significant reductions in Fear, Anxiety, Verbal Protest, Physical Protest, and Physical Expression of Pain during the injection as assessed by the Nurse Rating Scale (NRS). No significant change was observed in the degree of Verbal Expression of Pain for the Experimental Group. Thus, Hypothesis 1 is partially supported.

The Experimental Group was found to be significantly more cooperative during an injection following the intervention.

Thus, Hypothesis 2 is supported.

The Experimental Group was also found to exhibit significant reductions in heart rate and perceived pain as measured by the Hand Pressure Pain Index (HPPI). Hypotheses 3 and 4 are thus supported.

Children who received no planned intervention (Control Group) displayed no significant changes in NRS, heart rate, or HPPI as evaluated during consecutive injections. Hypothesis 5 is thus supported.

The diverse nature and differing etiologies of children's needle fears were explored through the evaluation of projective drawings and stories. The utilization of such techniques to monitor change in the attitudes of individual children was demonstrated.

Based upon these findings, it was concluded that a comprehensive program of intervention is capable of reducing the fear and anxiety children experience, and improving the behavior they display in association with needles. In addition, exposure to the brief, cognitive intervention was shown to reduce the amount of pain children experience as a result of encounters with needles.

In accordance with these conclusions, suggestions were made concerning changes in the treatment of children during procedures involving needles. The importance of providing information in an open, honest, supportive environment, encouraging expression of fears, fantasies and misconceptions, and allowing the child to exercise some control over the situation were stressed.

REFERENCES

- Agras, S., Sylvester, D., and Oliveau, D. The epidemiology of common fears and phobia. Comprehensive Psychiatry, 1969, 10, 151-156.
- Ayer, W. A. Use of visual imagery in needle phobic children. Journal of Dentistry for Children, 1973, 40, 125-127.
- Bandura, A., Blanchard, E. B., and Ritter, B. Relative efficacy of desensitization and modelling approaches for inducing behavioral, affective, and attitudinal changes. Journal of Personality and Social Psychology, 1969, 13, 173-199.
- Bandura, A., Jeffery, R. W., and Gajdos, E. Generalizing changes through participant modeling with self-directed mastery. Behavioral Research Therapy, 1975, 13, 141-152.
- Bandura, A. R., Jeffery, W., and Wright, C. L. Efficacy of participant modelling as a function of response induction aids. Journal of Abnormal Psychology, 1974, 83, 56.
- Barenie, J. T., and Ripa, L. W. The use of behavior modification techniques to successfully manage the child dental patient. Journal of the American Dental Association, 1977, 94, 329-334.
- Bernstein, D. A., Kleinknecht, R. A., and Alexander, L. D. Antecedents of dental fear. Journal of Public Health Dentistry, 1974, 39, 113-124.
- Brandt, P. A., Smith, M. E., Ashburn, S. S., and Graves, J. IM injections in children. American Journal of Nursing, 1972, 72, 1402-1406.
- Bruegel, M. A. Relationship of preoperative anxiety to perception of postoperative pain. Nursing Research, 1971, 20, 26-31.
- Burstein, S., and Meichenbaum, D. The work of worrying in children undergoing surgery. Journal of Abnormal Child Psychology, 1974, 7, 121-132.
- Carpenter, C. H. What technics may be used to secure relaxation in a child patient? Journal of Dentistry for Children, 1941, 8, 233-238.

- Chambers, W. G., and Price, G. G. Influence of nurse upon effects of analgesics administered. Nursing Research, 1967, 16, 228-233.
- Collins, L. G. Pain sensitivity and ratings of childhood experience. Perceptual and Motor Skills, 1965, 21, 349-350.
- Daniels, L. K. Rapid in-office and in-vivo desensitization of an injection phobia utilizing hypnosis. The American Journal of Clinical Hypnosis, 1976, 18, 200-203.
- Douglas, J. W. B. Early hospital admissions and later disturbances of behavior and learning. Developmental Medicine and Child Neurology, 1975, 17, 456-480.
- Drash, P. W. Behavior modification: New tools for use in pediatric dentistry with the handicapped child. Dental Clinics of North America, 1974, 18, 617-631.
- Edelman, R. I. Validity of verbal report as a prognosticator of physiological arousal to threat. Journal of Abnormal Psychology, 1970, 76, 492-495.
- Egbert, L. D., Battit, G. E., Turndorf, H., and Beecher, H. K. The value of the preoperative visit by an anesthetist. The Journal of the American Medical Association, 1963, 185, 553-555.
- Egbert, L. D., Battit, G. E., Welch, C. E., and Bartlett, M. K. Reduction of postoperative pain by encouragement and instruction of patients. New England Journal of Medicine, 1964, 270, 196-198.
- Fassler, D. G. Experiences with children and books in hospital settings. Journal of the Association for the Care of Children in Hospitals, 1977, 6, 12-16.
- Fassler, D. G. Reducing preoperative anxiety in children: Information versus emotional support. Patient Counseling and Health Education, 1980a, 2, 130-134.
- Fassler, D. G. The young child in the hospital. Young Children, 1980b, 35, 18-23.
- Fassler, D. G. and Wallace, N. Children's fear of needles, Clinical Pediatrics, 1982, 21, 59-60.
- Fazio, A. F. Implosive therapy in the treatment of a phobic disorder. Psychotherapy: Theory, Research and Practice, 1970, 7, 228-232.

- Ferguson, J. M., Taylor, C. B., and Wermuth, B. A rapid behavioral treatment for needle phobics. The Journal of Nervous and Mental Disease, 1978, 166, 294-298.
- Ferguson, J. M., Wermuth, B. M., and Taylor, C. B. Rapid desensitization of a needle phobia by participant modeling. The Western Journal of Medicine, 1976, 124, 174-176.
- Fernald, C. D. and Corry, J. J. Empathic versus directive preparation of children for needles. Children's Health Care, 1981, 10, 44-47.
- Frankl, S. N., Shiere, F. R., and Fogels, H. R. Should the parent remain with the child in the dental operatory? Journal of Dentistry for Children, 1962, 29, 150-163.
- Freud, A. The role of bodily illness in the mental life of children. Psychoanalytic Study of the Child, 1952, 7, 69-81.
- Fuller, N. P. Journal of the American Dental Association, 1980, 100, 172.
- Gale, E. N. Fears of the dental situation. Journal of Dental Research, 1972, 51, 964-966.
- Gale, E. N., and Ayer, W. A. Treatment of dental phobias. Journal of the American Dental Association, 1969, 78, 1304-1307.
- Garrod, A. E. Diseases of children. Baltimore : Williams & Wilkins Co., 1947.
- Gordon, D. A., Terdal, L., and Sterling, E. The use of modeling and desensitization in the treatment of a phobic child patient. Journal of Dentistry for Children, 1974, 41, 102-105.
- Gracely, R. H., and Dubner, R. Pain assessment in humans: A reply to Hall. Pain, 1981, 11, 109-120.
- Hafner, R. J. Fresh symptom emergence after intensive therapy. British Journal of Psychiatry, 1976, 129, 378-383.
- Hall, W. On "ratio scales of sensory and affective verbal pain descriptors." Pain, 1981, 11, 101-107.
- Harland, R. W. Children's fears. Australian Dental Journal, 1960, 5, 18-22.

- Herbertt, R. M., and Innes, J. M. Familiarization and preparatory information in the reduction of anxiety in child dental patients. Journal of Dentistry for Children, 1979, 46, 319-323.
- Hill, H. E., Kornetsky, C. H., Flanary, H. G., and Wikler, A. Effects of anxiety and morphine on discrimination of intensities of painful stimuli. The Journal of Clinical Investigation, 1952, 31, 473-480.
- Hsu, L. K. G. Novel symptom emergence after behavior therapy in a case of hypodermic injection phobia. American Journal of Psychiatry, 1978, 135, 238-239.
- Johnson, J. E., Kirchhoff, K. T., and Endress, M. P. Easing children's fright during health care procedures. The American Journal of Maternal Child Nursing, 1976, 1, 206-210.
- Johnson, P. A., and Stockdale, D. F. Effects of puppet therapy on Palmer Sweating of hospitalized children. The Johns Hopkins Medical Journal, 1975, 137, 1-5.
- Kaho, N. A new approach for dentistry in psychosomatic medicine and mental health. Journal of Oklahoma Dental Association, 1955, 43, 25-31.
- Kassowitz, K. E. Psychodynamic reactions of children to the use of hypodermic needles. Journal of Diseases of Children, 1958, 95, 253-257.
- Katz, R. C. Single session recovery from a hemodialysis phobia: A case study. Journal of Behavioral Therapy and Experimental Psychology, 1974, 5, 205-206.
- King, J., and Ziegler, S. The effects of hospitalization on children's behavior: A review of the literature. Children's Health Care, 1981, 10, 20-28.
- Kleinknecht, R. A., Klepac, R. K., and Alexander, L. D. Origins and characteristics of fear of dentistry. Journal of the American Dental Association, 1973, 86, 842-848.
- Kremer, E., and Atkinson, J. H. Pain measurement: Construct validity of the affective dimension of the McGill pain questionnaire with chronic benign pain patients. Pain, 1981, 11, 93-100.
- Lazarus, A. A., and Abramovitz, A. The use of "emotive imagery" in the treatment of children's phobias. Journal of Mental Science, 1962, 108, 191-195.

- Levy, D. M. The infant's earliest memory of inoculation: A contribution to public health procedures. The Journal of Genetic Psychology, 1960, 96, 3-46.
- Lewis, N. The needle is like an animal: How children view injections. Children Today, 1978, January-February, 18-21.
- McBride, M. A. B. Nursing approach, pain, and relief: An exploratory experiment. Nursing Research, 1967, 16, 337-341.
- McCaffery, M. Children's responses to rectal temperatures: An exploratory study. Nursing Research, 1971, 20, 32-45.
- McCaffery, M. Pain relief for the child: Problem areas and selected nonpharmacological methods. Pediatric Nursing, 1977, July-August, 11-16.
- Mechanic, D. The influence of mothers on their children's health attitudes and behavior. Pediatrics, 1964, 33, 444-453.
- Melamed, B. G., Meyer, R., Gee, C., and Soule, L. The influence of time and type of preparation on children's adjustment to hospitalization. Journal of Pediatric Psychology, 1976, 1, 31-37.
- Melamed, B. G., & Siegal, L. J. Reduction of anxiety of children facing hospitalization and surgery by use of filmed modeling. Journal of Consulting and Clinical Psychology, 1975, 43, 511-521.
- Melzack, R. The perception of pain. Scientific American, 1961, 204, 41-49.
- Menke, E. M. School-aged children's perception of stress in the hospital. Children's Health Care, 1981, 9, 80-86.
- Miller, L. C., Barrett, C. L., Hampe, E., and Noble, H. Comparison of reciprocal inhibition, psychotherapy, and waiting list control for phobic children. Journal of Abnormal Psychology, 1972, 79, 269-279.
- Moss, F. T., and Meyer, B. The effects of nursing interaction upon pain relief in patients. Nursing Research, 1966, 15, 303-306.
- Nash, J. L. Behavior therapy in an army mental hygiene clinic: Deconditioning of a phobia: Case report. Military Medicine, 1971, 136, 639.

- Nimmer, W. H., and Kapp, R. A. A multiple impact program for the treatment of injection phobias. Journal of Behavior Therapy and Experimental Psychiatry, 1974, 5, 257-258.
- Oswalt, R. M., and Napolliello, M. Motivations of blood donors and nondonors. Journal of Applied Psychology, 1974, 59, 122-124.
- Petrillo, M., and Sanger, S. Emotional care of hospitalized children: An environmental approach. Philadelphia : J. B. Lippincott Co., 1972.
- Plank, E. Working with children in hospitals. Cleveland : The Press of Case Western Reserve University, 1971.
- Prugh, D. G., Straub, E. M., Sands, H. H., Kirschbaum, R. M., and Lenihan, E. A. A study of the emotional reactions of children and families to hospitalization and illness. American Journal of Orthopsychiatry, 1953, 23, 70-106.
- Rosenberg, H. M. Behavior modification for the child dental patient. Journal of Dentistry for Children, 1974, 41, 111-114.
- Savide, N. L., Blain, S. M., and Jedrychowski, J. R. The use of systematic desensitization in the dental treatment of a mentally retarded adolescent. Journal of Dentistry for the Handicapped, 1978, 4, 10-13.
- Schoenrade, W., and Schroder, G. Mothers as cotherapists in behavior therapy of children with extreme fear of blood tests. Praxis der Kinderpsychologie und Kinderpsychiatrie, 1977, 26, 56-62.
- Schowalter, J. E., and Lord, R. D. On the writings of adolescents in a general hospital ward. The Psychoanalytic Study of the Child, 1972, 27, 181-200.
- Sermet, O. Emotional and medical factors in child dental anxiety. Journal of Child Psychology and Psychiatry, 1974, 15, 313-321.
- Shapiro, A. H. Behavior of kibbutz and urban children receiving an injection. Psychophysiology, 1975, 12, 79-82.
- Shaben, E. J., and Borland, L. An empirical study of the etiology of dental fears. Journal of Clinical Psychology, 1954, 10, 171-174.
- Shor, R. E. Physiological effects of painful stimulation during hypnotic analgesia under conditions designed to minimize anxiety. The International Journal of Clinical and Experimental Hypnosis, 1962, 10, 183-202.

- Siegel, L. J. Preparation of children for hospitalization: A selected review of the research literature. Journal of Pediatric Psychology, 1976, 1, 26-30.
- Skipper, J. K., and Leonard, R. C. Children, stress, and hospitalization: A field experiment. Journal of Health and Social Behavior, 1968, 9, 275-287.
- Sorenson, H. W., and Roth, G. I. A case for nitrous oxide-oxygen inhalation sedation: An aid in the elimination of the child's fear of the "needle." Dental Clinics of North America, 1973, 17, 51-66.
- Taylor, C. B., Ferguson, J. M., and Wermuth, B. M. Simple techniques to treat medical phobias. Postgraduate Medical Journal, 1977, 53, 28-32.
- Turnage, J. R., and Logan, D. L. Treatment of a hypodermic needle phobia by in vivo systematic desensitization. Journal of Behavior Therapy and Experimental Psychiatry, 1974, 5, 67-69.
- Vernon, D. T. A., and Bigelow, D. A. Effect of information about a potentially stressful situation on responses to stress impact. Journal of Personality and Social Psychology, 1974, 29, 50-59.
- Webb, C. Tactics to reduce a child's fear of pain. American Journal of Nursing, 1966, 66, 2698-2701.
- Wessel, M. A. To cure sometimes, to relieve often, to comfort always. Connecticut Medicine, 1980, 44, 111-112.
- Wolfer, J. A., and Visintainer, M. A. Pediatric surgical patients' and parents' stress responses and adjustment. Nursing Research, 1975, 24, 244-255.
- Wolpe, J. Psychotherapy by reciprocal inhibition. Stanford : Stanford University Press, 1958.
- Wynne, L. Synthesis of appropriate patient behavior in an aversive dental environment. Perceptual and Motor Skills, 1974, 38, 519-524.
- Zeifert, M. Psychiatric aspects of dentistry. Journal of the California Dental Association. 1953, 29, 316-317.

APPENDIX A

Letter to Parents

Hosp. Unit No.

Addressograph

IV. CONSENT FOR PARTICIPATION IN A RESEARCH PROJECT

YALE UNIVERSITY SCHOOL OF MEDICINE - YALE-NEW HAVEN HOSPITAL

Invitation to Participate and Description of Project:

You (your child) are invited to participate in a study aimed at helping to reduce the fear of needles in children. This invitation is being extended to a random selection of children in the hospital between the ages of 6 and 9.

The study involves reading stories, playing with toys, drawing pictures, and talking with the children about their thoughts and feelings concerning injections. These activities will take approximately 45 minutes. Additional procedures are as follows: immediately before an injection, the child's pulse will be taken; after the injection, the child will be asked to express how much the needle hurt by squeezing a rubber ball. The study will involve working with each child during 2 injections.

There are no anticipated risks associated with participation in this study. The potential benefits include increasing your child's understanding of certain medical procedures. It is the assumption of this study that the activities employed will help reduce your child's fear of needles. All information gained in this study will remain strictly confidential. No names will be used in any connection when reporting the results.

Participation in this study is entirely optional. The decision is up to you. Should you decide to participate, you are free to withdraw at any time. Your participation, lack of participation, or withdrawal from participation will in no way effect any other aspect of the care and

treatment your child receives in the hospital.

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think this over.

Authorization: I have read the above and decide that.....
 (name of subject)
 will participate in the project described above. Its general purposes, the
 particulars of involvement and possible hazards and inconveniences have been
 explained to my satisfaction. My signature also indicates that I have received
 a copy of this consent form.

.....
Signature

Relationship (self, parent, guardian, etc.)

.....
Date

.....
Signature of Principal investigator Telephone
or

.....
Signature of Person obtaining consent Telephone

APPENDIX B

Nurse Rating Scale



The Children's Hospital Medical Center

300 Longwood Avenue, Boston, Massachusetts 02115, Telephone: (617) 734-6000

Department of Psychiatry

Please rate the degree to which the child displayed each of the following traits during the injection:

	no expression											extensive expression
Fear	0	1	2	3	4	5	6	7	8	9	10	
Cooperation	0	1	2	3	4	5	6	7	8	9	10	
Anxiety	0	1	2	3	4	5	6	7	8	9	10	
Verbal Protest	0	1	2	3	4	5	6	7	8	9	10	
Physical Protest	0	1	2	3	4	5	6	7	8	9	10	
Verbal Expression of Pain	0	1	2	3	4	5	6	7	8	9	10	
Physical Expression of Pain	0	1	2	3	4	5	6	7	8	9	10	

Additional Comments:

Child's Name _____

Date _____

Your Name _____

Thank you,

David Fassler

APPENDIX C

Children's Book Illustrations

Depicting Injection

(from TOMMY GOES TO THE DOCTOR by Gunilla Wolde)

Next the doctor wipes Tommy's arm
with a piece of cotton.

"Now I am going to give you a shot," she says.

"Try to keep your arm very still, Tommy."



She quickly pushes a little needle in his arm,
and Tommy yells, "Ow!"



APPENDIX D

Needle Poem

NO MORE SHOTS

When I went to the doctor,
He had lots to do.
He looked in my eyes,
And in my ears, too.

I said "Ahhh" for him,
And he checked out my throat.
"It looks fine," he told me,
And that's what he wrote.

He listened to my chest,
To hear my heart beat.
Then, believe it or not,
He tickled my feet.

With a small rubber hammer,
He tapped on my knee.
With a chart on the wall,
He could tell how I see.

He weighed me on a scale,
And measured my height.
"So far," I thought,
"This doctor's all right."

Then he told me a needle,
I'd have to get.
"That's what you think," I said,
"Do you want to bet?"

I'm fed up with needles,
With shots of all kinds.
I won't let them do it,
Not in the arm or behind.

It'll take ten people,
To hold me still.
I'll kick and I'll bite,
Really, I will!

They're sharp and they're pointy.
My arm hurts already.
It might go in too far,
It's so hard to hold steady.

I'm scared it might break,
While still in my arm.
Or go all the way through,
And do lots of harm!

So I told the doctor,
"No more shots for me.
Please forget the idea,
Or I'll climb up a tree.

"If you know what's best,
Don't try to catch me.
I would escape in a spaceship,
You just wait and see.

"I would cross the ocean,
To stay away from that shot.
I'd face bears in a forest,
Believe it or not.

I'd hide in a castle,
And lock all the doors,
Before you touch me,
With that needle of yours."

Then I had an idea,
I knew what to do.
I'll show them all,
They'll be sorry, too!

Very calmly, I said,
"Now Doctor, it's clear,
That you are the one
Who needs the shot here."

He looked quite surprised.
He wasn't sure what to say.
"But why do I need it?
I feel fine today."

"It'll help you stay well,"
I said, and I knew,
If I didn't help him,
He might catch the flu.

Or measles, or mumps,
Or a bad kind or cold.
"Just listen to me,
And do what you're told.

"Kids always get shots.
Now I'm making no deals.
It's important for you
To know how it feels."

My doctor looked frightened,
For a minute or two.
I guess he doesn't like shots,
Any more than I do.

I made believe,
That I was preparing a shot.
I told him to hold still,
Or it would hurt a lot.

"You need this shot,
I'll tell you why.
It'll help keep you healthy,
If it hurts, you can cry.

"Shots aren't punishment,
For being bad.
Try and understand,
And don't be too mad.

"I know you won't like this,
You're scared and upset.
Now try to relax,
Think of a toy you might get."

With alcohol,
I rubbed the spot,
Where soon my doctor,
Would get his shot.

I took my pretend needle,
And stuck it in his arm.
The look on his face,
Was one of alarm.

"I'm finished," I said.
"It hurts," he replied.
I said, "Told you so,
Now you're on my side."

Then he gave me a shot,
And I let out a roar.
Now it's all over,
But my arm is still sore.

I still don't like shots,
But it made me feel good,
To know that at least,
My doctor understood.

YALE MEDICAL LIBRARY

Manuscript Theses

Unpublished theses submitted for the Master's and Doctor's degrees and deposited in the Yale Medical Library are to be used only with due regard to the rights of the authors. Bibliographical references may be noted, but passages must not be copied without permission of the authors, and without proper credit being given in subsequent written or published work.

This thesis by _____ has been used by the following persons, whose signatures attest their acceptance of the above restrictions.

NAME AND ADDRESS

DATE

Cornie Kreis 54 William St NH 06511

Nancy Olson 942 State St NH 06511

Paul Sanborn 2 Livingston St NH 06511

Mitchell Jay Sklar

10/10/84

4/24/85

